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In This Issue—*New York Show*

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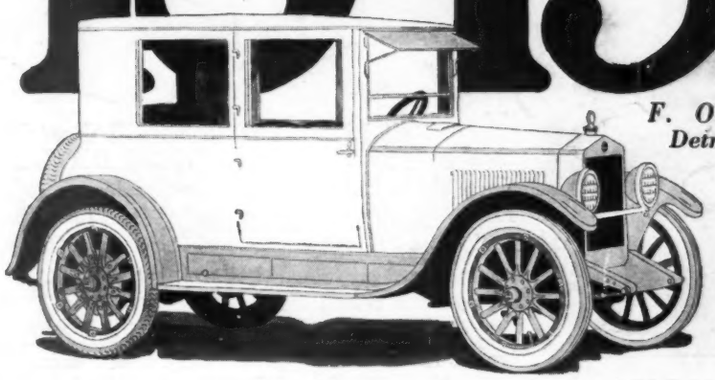

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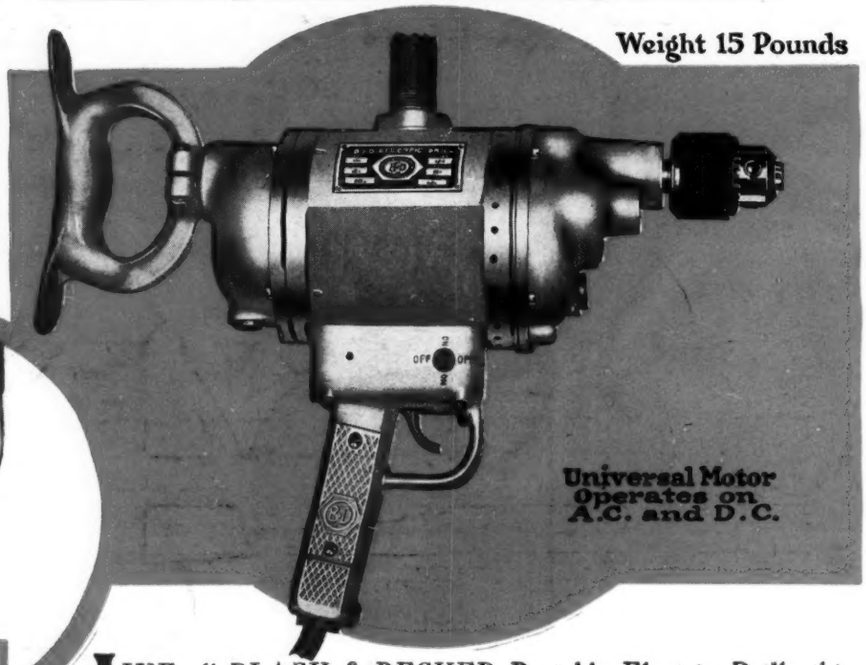
"With the Pistol Grip and Trigger Switch"

Weight 15 Pounds



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1922 Price

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MOTOR AGE

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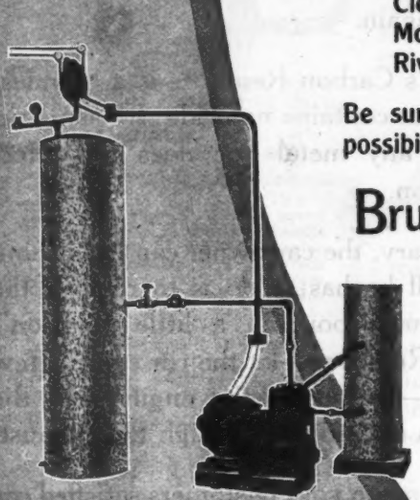

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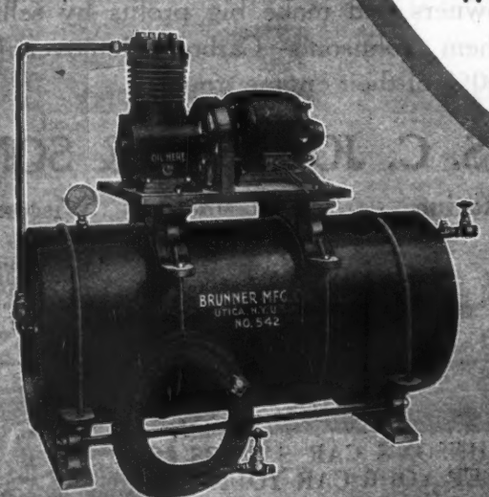
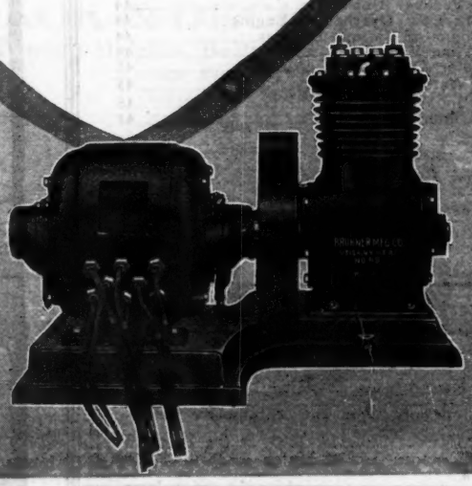




Vol. XLI, No. 2 CHICAGO, JANUARY 12, 1922 $3 Per Year

1922 Show Reveals a Much Improved Car

NEW YORK exhibition raises hopes of dealers for a good season. Vehicle shows long steps forward and only doubt raised is that concerning price stabilization and sales methods. Used cars uppermost in minds of sales folks

By CLYDE JENNINGS

THE 1922 show season was opened at the Grand Central Palace here today when the doors were thrown open for the first of the two shows given under the direction of the National Automobile Chamber of Commerce. There was the usual rush for entrance at 2 p. m. and there was a good attendance in the afternoon, although not up to the standards of the previous years, either in numbers or appearance.

In the evening the attendance was heavier and quite a long line formed at the cash ticket window. By the time the doors were closed for the over-Sunday vacation, the men of the industry present expressed themselves as satisfied with the prospect for the New York show's success, which they argue is a criterion of the interest to be shown in automobile shows throughout the country. Everybody asserts that a better and more

Accessory Exhibits Are Beauty Spots at Gotham Display

interesting car is shown, that the manufacturer is more keenly interested in merchandising than ever before and that the future looks good.

The crowd was a hard one to analyze, and that was what most of the professional automobile men are here for.

Interest As Great As Ever

The attitude of the men from the factories and dealers in New York and from all parts of the country is one of expectation. They want to see if the New York show will indicate what the season holds in store for them. Late tonight they were putting off the decision until Wednesday. They had not passed judgment further than to say that they believed that the popular interest in automobiles was as great as ever and that the public would again pay to see an automobile show this year.

The acute interest of the first day was centered in the price situation. Everybody was asking who had reduced and how much. A careful census of the show brought out 18 announced reductions, none very radical. These are told in detail on another page.

There are some puzzling situations at this writing. Dodge had been looked to for a price adjustment, but at the Dodge space, at the very front of the main floor, there is a complete silence as to prices. The new Dodge job, the business coupe, is on exhibition but it is not priced. Not even the declaration that you wanted to buy one right then and there would tempt a salesman into discussing the price. Just when the Dodge prices are to be released, no one is authorized to say. Many predictions were that they would be in the Sunday paper, but they were not.

The discussion of the prices, brought out much discussion of the effect of these price changes. In the main, the New York distributors said that the price reductions recently made had not helped them materially, but the factory salesmanagers were strong in their statements that the price reductions had stimulated sales in the country generally. And there comes the difference of opinion that started a long discussion that will not be ended until the spring selling season is under way.

The main point in this discussion is: Whether or not the people, who must supply the opinion that counts, are convinced that the price reductions are at an end and the time to buy an automobile has arrived. In the main, the factory people and the dealers believe that prices must stay fixed for a few weeks if the people accept them as the stable prices.

All are convinced that reductions have been too frequent to be convincing and that many people are still expecting further reductions; that a good many people are rather of the opinion that the factories can turn out more cars than will be sold and that a price slashing campaign, regardless of cost, may be the result. These men who are looking to the industry for a living in the next few years want to see a stabilization begin at once, so they can go ahead with the conviction that they are doing the right thing.

An Increase in Price

Perhaps the most welcome announcement made at the show was the increased price for the Oakland car. The dealers who are praying for something to indicate a stabilization of price regard this as a move in the right direction and they are inclined to give General Motors credit for it. Many of the dealers say openly that the best single thing that could happen would be for Ford to announce an increase in price of any value. A $10 increase in Ford prices would be hailed with the greatest delight for its effect on the public mind.

The price stabilization and the used car situation are the sore thumbs. Dealers are convinced, after a hasty visit to the show, that the industry has made progress and that the article of merchandise is much better; that the public is interested and that the stage is set for a good season if the public does not fail to do its part.

As the public has never failed the industry except for very good reasons, the dealer is inclined to be cheerful.

New cars are numerous. Nearly everybody had new cars to announce, but some of them were not impressive to the person who is familiar with the cars of the past. In some cases the removal of the running board and the substitution of aluminum steps served as a basis for the announcement of a new model. In other cases a change of carbureter or some similar part is the basis.

Business Cars In Evidence

But that is not true in all cases, of course. There were some very interesting new models. The new roadster-coupes were an interesting feature. These are primarily business cars and it is the expectation that they will be in great demand for business and professional men. In the main they are roadsters with a permanent top, usually made of leather and with a minimum of glass. In this class came the new Dodge model. Other cars in this class are the Hupp, Reo, Dort and Nash, the latter being on the four-cylinder chassis. These cars attracted a good deal of attention, especially from the men who are expected to be their chief users. New York dealers are enthusiastic about the sales prospects of this model.

There are, of course, new models that actually are new, concerning which the curiosity of the public has been aroused and which receive their full share of attention from the visitors. Among these are the Chandler, Velie and Elgin. The Chandler had been well advertised in the New York papers as a mystery and people who follow the advertising for this class of car are anxious to see it and to learn further details.

It remained a mystery as far as price is concerned for today, as the factory officials had not arrived and the men in the exhibit were noncommittal as to the price that would be announced. The Elgin and the Velie had not been heralded in the same way as the Chandler, but there soon was a crowd around them and the crowd remained there during the day and evening.

New Franklin Arouses Interest

But the chief mystery of the show was not at the Grand Central Palace at all, although it was reported to have been there in the morning and withdrawn before the doors were opened. This was the new Franklin, a four-cylinder air cooled car that it is reported will sell for $1,000. The experimental work on this car has been completed, but the factory is not yet ready to produce it. After placing it in the exhibit as a possible counter for any other new air cooled car, and then learning that there were none in the show, the men behind this car withdrew it and will hold an unveiling later in the week, when a selected group will see it and hear all details of manufacture.

The description released is that this car is designed to make from 28 to 30 miles per gallon and will develop a speed of 60 m.p.h. The touring car price will be about $1,000 and the sedan $1,500. It will have a wheelbase of 103 inches and will generally follow the lines of the six-cylinder Franklin. Improvements have been made in the induction jacket and the regular Franklin vaporizing system will be used. It will have semi-elliptical springs, front and rear. It is understood that John Wilkinson, the Franklin engineer, had this car well toward completion of design when the war changed all manu-

Better Cars for Better Business at the New York Show

facturing plans. Eventually it is expected that a new factory will be erected for the production of this vehicle.

Colors Too Conservative

The general appearance of the show is good. Some manufacturers have made an effort to brighten up their displays with a showing of color, but the funeral appearance still predominates. Most of the color schemes are very good, but in the main they could be criticized as being too conservative. Apparently the automobile manufacturers have not yet learned the secret that the carriage manufacturers learned many years ago.

It was the rule with the carriage and buggy men of two generations ago always to put bright colors on their country fair exhibit vehicles. People generally are the same, whether they are attending a county fair in a thinly peopled district or an automobile show in Manhattan. As one woman, looking down from the second floor to the first, asked her escort, "Ain't there any good paint but black?" A glance from her position revealed that in the corner of the first floor which she could see, there was not a single bright colored car. Several were maroon, dark green or similar color, but they were too conservative to appeal strongly to the eye.

Bright Colors Attract Passers

It is noticeable that the bright colored cars, and the one white one, attracted practically every person who passed the exhibits and even when the observers did not fully agree with the color scheme, they stopped to look and often to listen.

It is curious to note where the crowd stops. The Stanley, the only steam car in the show, always has a crowd as it has had in previous years. One can never get close to the Stanley power plant without waiting a turn, and there always is some one there to answer questions. The Wills-Sainte Claire exhibit boasts of a lecturer who is equipped with charts and who has a long and interesting line of talk which holds some people for a surprising length of time. At one time he says: "I suspect that some of you have not been here since I began talking two hours ago, but you would be interested in this entire story, and I could take all day to tell it." As an indication that his audience was interested, not a single laugh greeted this statement.

Lincoln also has a lecturer who talks of the manufacturing advantages of this car and its new plant. The Cleveland has in its exhibit a man who talks well on the chassis when questions are asked. In fact, most exhibits boast of a factory man who knows much more about what makes the wheels go round than the average salesmen. In all, there is an opportunity for a good deal of education by making the round leisurely.

All of this may be taken as an evidence that the exhibitors are leaning toward Norvell Hawkens' advice that the "customer is boss."

Salesmen on the Job

It was quite refreshing to see the attitude of the salesmen toward visitors. In nearly all cases, the visitor is approached immediately he enters the exhibit and if he displays any unusual interest, the door of the car is opened and he is invited to step in, and a great many avail themselves of this invitation. Indeed, it was not unusual to see every car in the exhibit occupied by persons who appeared to be amply able to buy the sort of a car they are trying out. There are not more than a dozen ribbons over the hoods of the cars in exhibition and not a single ribbon on the doors. Even the handsomest of the sedans appeared to be available for all comers and many persons who would not otherwise get to enjoy the situation of sitting in a handsomely upholstered, special body job, get that experience at this show. It is a far cry from the last two years, when cars were guarded so jealously, apparently with the idea that after the show they could be rushed out to delivery to some waiting customer.

The long time objection that the salesmen in the exhibits have not been properly trained still holds good. These men told all sorts of conflicting stories about the automotive industry performance during the last year and of the percentage represented in price adjustments. Also they handled percentages as regards their own and competitors' adjustments with an entire disregard of mathematics.

It does not appear that the men who plan these exhibits give much attention to the personnel, except as to inquire which of the salesmen are the fortunate possessors of dinner coats and white shirts. It does not appear to have occurred to these men that the industry should go to the public with the same sort of a story to stabilize opinion, but these spokesmen are permitted to add rumors to rumors and to hint mysteriously of things to happen in the future.

Accessories Get Much Attention

None who visited the show could fail to note the interest shown by a great majority of the visitors for the accessory exhibits, where a real effort has been made to attract the attention of the public. In almost every booth on the two upper floors there is a flash of color and something moving with a more or less unusual motion. A five-foot-long windshield cleaner that continually sweeps over the immense glass is a never-ending source of amusement, as is the seal that balances piston rings on its nose.

Progress through the accessory aisles is much slower than through the car exhibit aisles and this is taken as an indication that owners who may not be interested in a new car are still interested in the fitments for the car. The axles, clutches, die castings and other things that are invisible to many car owners are looked over in this department by hundreds of people, some of whom ask if they are parts of automobiles.

There is not much that was strikingly new in this department, but there are many accessories, large and small, that show refinement in design and manufacture. From a dealer standpoint, this part of the show does not compare well with the A. E. A. equipment show in November, but from the owner standpoint, it is a much advanced show which is, of course, as it should be.

While we cannot attempt at this time to give the verdict as to this show, there is no question but that the dealers who are here are pleased with the first impression. The dealers point out these things as being above change in whatever conclusion may be reached later:

The average of the cars shown is much higher as to design and manufacture.

STATISTICAL NUMBER OF EXHIBITORS AT HOTEL SHOWS

	1922
Total exhibitors	8
Gasoline	8
Electric	..
Steam	..
Cars exhibited	24
Gasoline	12
Electric	..
Stripped chassis exhibited	3
Engine Characteristics—Gasoline Cars	
Four-cylinder	7
Six-cylinder	8
Air-cooled	4
Water-cooled	11
Poppet valve	15
Sleeve valve	..
L-head	11
T-head	4
Body Styles—Gasoline Cars	
Open cars	7
Roadsters, two and three-passenger	2
Touring cars, four and five-passenger	4
Touring cars, six and seven-passenger	1
Enclosed cars	5
Coupes, two and three-passenger	..
Sedans, four and five-passenger	4
Other enclosed cars, six and seven-passenger	1
Wheel Styles—Gasoline and Electric Cars Standard Equipment	
Wire wheels	4
Disk wheels	4
Artillery wheels	7

The accessibility is improved in practically every change made.

The coach work is better, the upholstery and trimmings of better grades.

The cars are, in the main, more pleasing to the eye.

Several of the new closed car jobs reduce the spread between the open and touring closed cars, which they regard as necessary.

The one great question is:

WILL THE PUBLIC BUY? IF THEY BUY, WILL IT BE NEW OR USED CARS?

And there is another question that is uppermost in many minds at this show:

WHAT OF THE USED CARS?

There is no question but that almost every professional here is thinking of used cars.

Manufacturers realize that their dealers are heavily loaded with used cars and that they must get rid of these in order to realize on the new car business. The fact that this is a topic for conversation at this National Show is a very good omen, as it indicates that the manufacturer is thinking along this line to an extent that he is willing to admit that he is and has been thinking. He admits that he is not yet able to solve the problem, but he usually has some theory and will do something that will at least be helpful to a degree.

The biggest single step forward appears to be that a man from the factory will talk of production and used cars in the same sentence.

At the Hotels

THERE is the usual fringe of exhibits at the hotels. Some of these cars are fine looking jobs, as a car built in an experimental laboratory should be. At the Commodore are:

The Fox aircooled job, which has been much talked of, has a very handsome Durham body on it. No date is given for production of this car.

The Gray car attracted much attention. It was priced "under $500," and is not yet in production.

The Gearless Steam car was rather to one side of the main path and there was nothing to see that was interesting as to its mechanism, which is the chief talking point. Its two pistons act directly to the back wheels.

The Bay State car is built at Framingham, Mass., where it is fathered by a body plant owned by R. H. Long. Only closed cars were priced.

The Driggs was shown for the first time. It is manufactured in New Haven, Conn., and has some interesting engineering. The Ogren has one closed car on display.

The Apex Motor Corp. showed the Ace car again with an unfinished aluminum sedan body.

The Neracar, which classes nearer a motorcycle than a car, attracted much attention.

At the Astor are the Ferris and the Sub. The latter is an unusual looking aircooled car.

Statistical Picture of Ten New York Shows

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Total exhibitors	424	349	317	319	323	331	198	307	307	337
Gasoline	...	...	...	...	...	...	...	...	83	83
Electric	...	...	...	...	...	...	...	...	3	3
Steam	...	...	...	...	...	...	...	...	...	1
Accessory exhibitors	320	259	223	306	227	252	141	225	221	250
Cars exhibited	276	269	226	264	282	263	225	334	341	310
Gasoline	226	265	221	251	272	252	223	324	334	302
Electric	10	4	7	13	10	11	2	8	7	6
Steam	...	...	...	...	2	4	...	2	1	2
Stripped chassis exhibited	49	37	51	56	54	34	...	...	38	36
ENGINE CHARACTERISTICS—GASOLINE CARS										
Four-cylinder	229	183	146	158	146	94	40	65	80	84
Six-cylinder	133	131	160	154	161	171	141	223	213	204
Eight-cylinder	...	...	8	50	55	40	34	29	31	41
Twelve-cylinder	...	...	...	17	16	9	8	7	3	2
Air-cooled	5	6	3	3	...	...	...	...	7	8
Water-cooled	261	258	218	248	...	...	...	...	325	318
Poppet valve	215	254	213	247	270	252	...	...	321	319
Sleeve valve	10	10	6	15	2	...	...	...	12	8
Revolving disk valve	...	...	...	...	...	...	...	...	1	1
Valve-in-head	...	...	...	...	...	...	...	...	119	86
L-head	...	...	...	...	...	...	...	...	180	206
T-head	...	...	...	...	...	...	...	...	29	15
BODY STYLES—GASOLINE CARS										
Open cars	213	195	175	194	195	175	127	176	163	158
Roadsters, 2-3 passenger	52	51	51	76	68	40	...	...	40	29
Touring cars, 4-5 passenger	164	145	129	125	140	143	...	...	91	102
Touring cars, 6-7 passenger	164	145	129	125	140	143	...	...	32	27
Enclosed cars	53	43	36	28	37	77	79	119	120	149
Coupes, 2-3 passenger	19	17	7	6	6	13	...	...	23	47
Sedans, 4-5 passenger	2	2	3	2	...	43	...	...	80	80
Other closed 6-7 passenger	23	16	19	14	19	8	...	...	27	32
WHEEL STYLES—GASOLINE AND ELECTRIC CARS										
Standard Equipment										
Wire wheels	...	...	...	...	...	...	...	...	...	67
Disk wheels	...	...	...	...	...	...	...	...	...	36
Artillery wheels	...	...	...	...	...	...	...	...	...	229
Special Equipment										
Wire wheels	...	...	...	...	...	...	...	...	...	...
Disk wheels	...	...	...	...	...	...	...	...	...	1
Artillery wheels	...	...	...	...	...	...	...	...	...	...

PRICES Are Compelling Interest at the New York Show

Many Changes

Opening Day at National Motor Exhibition Tense with Rumors—Most Revisions Are Made in Medium Price Class—Need for Stability Recognized

New York, Jan. 7

PRICE readjustments are of paramount importance in the merchandising plans of the car maufacturers and the belief of the public that the exhibition would be ushered in with a wave of price revisions was well founded. The opening days of the show are bringing with them announcements that embrace many lines.

Manufacturers whose prices were lowered at the show are Reo, Lexington, Studebaker, Velie, Milburn electric, Peerless on its open models, Cleveland, Gardner on its sedan, Chandler on its new line, Paterson, Noma, Sayers, Standard, Grant, Maibohm, Crow-Elkhart, duPont, Kissel, Westcott, Premier, Elcar, Stephens, Auburn and Detroit electric. Oakland announced a slight revision upward on three of its models, the touring and sport remaining unchanged.

These price changes follow many others during the last few weeks, all of which were announced sufficiently early so that the public had ample time to become acquainted with them before the doors of the annual show swung open. These early changes were on the Cadillac, Hudson, Buick, Essex, Stearns, Oldsmobile, Saxon, R&V Knight, Paige, Apperson, Stutz, Nash, Haynes, Marmon, Hanson, Handley-Knight, Elgin, Stephens and Lafayette lines and an increase on the Davis.

Studebaker, Cleveland and Chandler were also the subject of much speculation as the show opened, as these lines are among the stiffest competition of the Buick, which is entering the new year with its second decline from the top price of 1920. Studebaker met the Buick price by naming $1045 on its redesigned light six, $1475 on the special six and $1785 on the big six, these representing reductions of $105, $160 and $200 respectively.

Cleveland dropped $100 on the touring car, bringing it to $1195, and Chandler, showing for the first time a five-passenger touring car, set a price on it of $1595, which compares with $1785 as the old price on the two and seven-passenger touring models. Cleveland made its best bid for prominence in price cutting by bringing its sedan down $700 to a new price of $1595.

Most Changes in Medium Class

The medium price class bore the brunt of the changes, and the lines selling in the neighborhood of $1500 show the results of the competition that has set in. Velie dropped from $1585 to $1395, thus coinciding to a penny with Buick. Reo brought its touring car down to $1595 and several others in the same class show by their revisions that they are fully awake to merchandising situation created by the present tendency to get rock bottom prices.

The new Rickenbacker car, on which production already has started and which perhaps is destined to play its part in the automotive world, came out with a list that fixes its touring car at $1485, its sedan at $1985 and its coupe at $1885. The first announcements of the Rickenbacker stated that its touring car would fall below $1500 and its sedan under $2000. These figures are barely shaded.

Two other cars concerning which there had been speculation were the Gray, which F. L. Klingensmith, the former Ford official, is to build in the Gray plant at Detroit, and the new Hanson six, which had been advertised to be the lowest-priced six made in America. The Gray was exhibited in one of the hotels, with a price announcement reading that it would list below $500.

This was all the information that could be elicited from the Gray officials, who refused to place a definite figure, although insisting that production plans had been completed. Hanson came out with a price of $995, thus coming into the magic field that lists below $1000, all the other members of which are powered with four-cylinder engines.

Opening Day Rife With Rumors

The opening day of the show was surcharged with speculation about prices. Manufacturers and their representatives seemed to realize that a great part of their hopes for a successful year were tied up in the necessity of reaching a price stability that would prove to the public that further cuts were not in the offing.

The public has grown weary with its rumors that tomorrow or the day after would see such and such a car brought down materially and consequently it was interpreted as watching the present exposition with a great deal of expectancy. From a merchandising standpoint, the public demand for lower figures had to be met and, fortunately in many cases, a cut was justified by the better position in regard to inventories, parts, labor, etc.

Factory executives, generally, seem to be thoroughly awake to this situation and, although many of them stated that they are making cuts now in advance of lowered production costs, they nevetheless are keen to prove that they had to come down to a minimum figure. Some executives expressed themselves as being so thoroughly sold on the fact that the minimum had been reached, that they speculated as to what the buyers would do on a rising market, provided manufacturers should raise prices in the spring or early summer. But this sort of talk was not frequent; officials rather took the standpoint that they had announced the 1922 prices and that they expected the present figure to carry them through the year.

The doctrine that prices must be stabilized has been well understood and, while there are too many complexities in the merchandising and manufacturing fields to assure that the lowest prices have been announced, there was everywhere the feeling that the 1922 models represent 100 per cent value.

Looking for Competitors' Action

The opening days of the show are too early, perhaps, to set at rest all of the price problem. Every manufacturer is scouting to find out just what his competitors are doing and the utmost secrecy surrounded many of the price changes until the last moment before they were announced. Some cars opened the first day with their old prices and were dropped before evening.

Others held off their price decisions until yesterday or today and there is yet a tendency to see what the other makers plan to do. This situation, however, should be ironed out before the close of the week and the meetings of factory officials, distributors and dealers should see the last of the cuts that can be attributed to the show.

Of course, some lines have absorbed any possible price reduction by improving quality, fittings, etc. There were several such cases and these manufacturers are meeting the price threat by more careful merchandising of their products. This becomes an individual problem, but manufacturers and dealers must accept it as a big factor in their 1922 merchandising plans.

It was significant that the price guarantee was absent, only McFarlan, so far as could be learned, guaranteeing that the present prices would hold until 1923. Also, there was no unanimity in regard to the readjustment of parts prices to the dealers. Some manufacturers have recently revised their parts lists or have new lists just coming out. Producers, however, who have not reduced car prices are not making a revision or contemplating any change, as a general rule, in their parts list.

New Prices Established at Show

Detroit Electric:

	New	Old
Model 90	$2800	$2985
Model 93	3500	3985

Sayers:

	New	Old
Touring car	$1695	$1795
Sedan	2795	2995

Rickenbacker:

Touring car (new model)	$1485
Sedan (new model)	1985
Coupe (new model)	1885

Dupont:

	New	Old
Roadster	$3000	$3400
Touring	3200	3400
Sedan	4000	4900
Coupe (new model)	3800	

Paterson:

	New	Old
5-passenger	$1550	$1595
7-passenger	1585	1625
Sedan and brougham	2595	2695

Noma:

	New	Old
1D Speedster	$3000	$3250
1D Foursome	3100	3350
1D Six	3200	3450

Kelsey:

6-cyl. touring (new model)	$1800
Coupe and Sedan (new model)	2700
Sport Roadster (new model)	2000
4-cyl. Touring (new model)	985

Reo:

	New	Old
Roadster	$1595	$1650
Touring	1595	1650
Business coupe	1895	.....
Coupe	2355	2700
Sedan	2435	2750

Oakland:

	New	Old
Roadster	$1120	$1095
Touring	1145	1145
Sport	1265	1265
Coupe	1685	1625
Sedan	1785	1725

Lexington:

	New	Old
5-pass. touring	$1985	$2100
7-pass. sedan	2285	2785
Thorobred	2100	

Ferris 60:

	New	Old
Roadster	$2575	$2695
Touring	2475	2595
Sedan	3475	3695

Premier:

	New	Old
5-pass. touring	$3100	$3690
Roadster	3150	3790
7-pass. touring	3250	3890
5-pass. sedan	5000	6000
7-pass. sedan	5100	6100
5-pass. brougham (new)	4300	

Elcar:

4-cyl. models—	New	Old
Open	$1095	$1145
Coupe	1345	1645
6-cyl. models—		
Open	$1395	$1595
Coupe	2065	2495
Suburban	2115	2395
Sedan	2165	2495

Velie:

	New	Old
Roadster	$1395	$1585
Touring car	1395	1585
Coupe	2085	2485
Sedan	2085	2485

The 5-passenger Milburn electric brougham was cut to $2385 from $2685.

Prices on open Peerless models have been reduced $90 from $2880 to $2790.

Cleveland:

	New	Old
Roadster	$1175	$1295
Touring car	1195	1295
Coupe	1550	2195
Sedan	1595	2295

The **Gardner** sedan has been reduced $100 from $1695 to $1595.

Hanson:

Light Six (new model)	$995

Standard:

Open models—	New	Old
2-4-7 pass.)	$2500	$3400
Sedan	3600	4800
Vestibule Sedan	3750	5000
Sedanette	3500	4500
Coupe	3250	4500

Maibohm:

	New	Old
4-pass. sport	$1495	$1595
Sedan and coupe	2165	2295
Touring	1395	unchanged

Crow-Elkhart:

	New	Old
4-cyl. touring car	$1095	$1295
6-cyl. touring car	1345	1543
6-cyl. sedan	2095	2395

All models reduced $200 to $300.

Kissel:

	New	Old
Standard touring	$2175	$2475
De Luxe touring	2675	2975
De Luxe coupe	3275	3775
De Luxe sedan	3475	3775

Studebaker:

Series 22, Special Six—	New	Old
Chassis	$1200	$1350
Touring	1475	1635
2-pass. roadster	1425	1585
Club roadster	1475	1635
Coupe (4-pass.)	2150	2450
Sedan	2350	2550
Series 22, Big Six—		
Chassis	$1500	$1650
Touring	1785	1985
Coupe	2500	2850
Sedan	2700	2950
New Light Six—		
Chassis	$ 875	$ 975
Touring	1045	1150
2-pass. roadster	1045	1125
Coupe roadster	1375	1550
Sedan	1750	1850

Fox:

Open models (new)	$3900
Coupe and sedan (new)	4900

Gearless (steam):

Roadster (new)	$2650
Touring (new)	2600

Sun:

Open (new)	$475

Frontenac announced that the touring car would list at about $2000 and the sedan at $2800 or $2900.

Chandler shows for the first time a 5-passenger touring car which is priced at $1595. The old price on the two and seven passenger touring cars was $1785.

Looking Over
The Field of New Cars

Much of Interest in the New Models for the Service Man. Tendency is for the Simplification of the Chassis and Better Built Bodies

By B. M. IKERT

THOSE who saw the opening of the New York show—providing they went through it with an eye directed towards the serviceability of the new cars—could not help realize that the makers of vehicles are giving more attention than ever towards the betterment of the product.

NOT only ought the new cars be easier to sell, but maintenance costs ought to be materially lessened for the owner by virtue of the fact that the cars are easier to work upon. More attention has been directed towards making the units accessible, and nuts and bolts are by far better located than ever before, so that the service man will have less difficulty in using socket or speed wrenches. There is almost a total elimination of the conventional underpan, used a few years ago and which formerly made it difficult to get at the crankcase. Most makers now use filler plates between the engine and frame side members.

BODIES are much better built, and there is a strong tendency to furnish them much more completely. The owner will not be required to spend many dollars in adding accessories which might as well come with the car. Cowl lights and drum type headlamps are in great evidence, and on the chassis one of the outstanding features is the adoption of the transmission brake on many new models. Cord tires also are practically now standard on all the new cars. New windshields are in evidence, and with them has come a narrowing of the top so that the usual side overhang has been avoided. On a streamline body this especially works out well.

ON the enclosed bodies there is a tendency to use aluminum, and in some cases no joints are used on the body, these being welded. Body molding, too, has come in for attention, this often being rolled integral with the panels instead of being screwed on.

ALL the cars are finished better, and many makers are furnishing genuine leather upholstery for the seats. The latter, too, have been made more spacious in many cases and a better balance has been struck between the forward compartment and the tonneau.

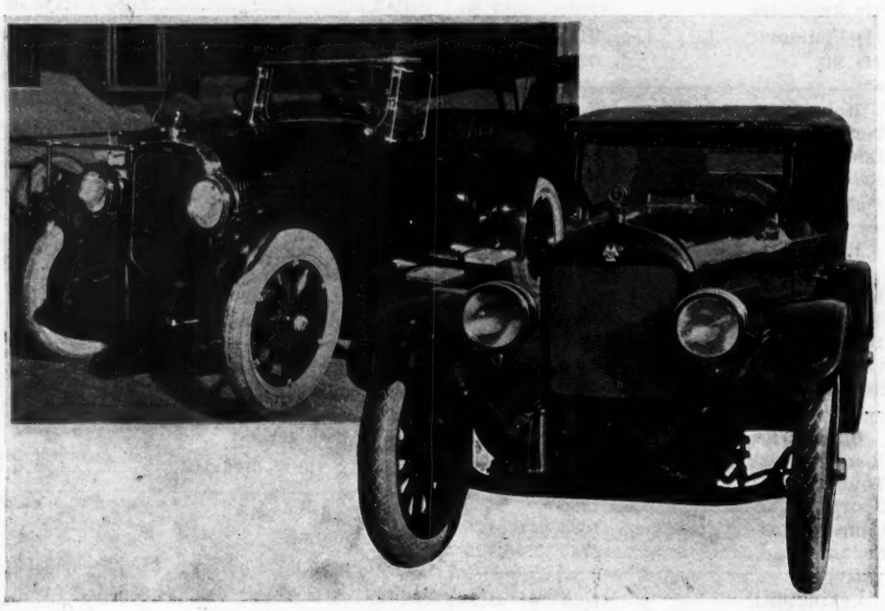
Chandler Chassis Improved in Design

EXTENSIVE changes have been made in the Chandler chassis, resulting in a quieter car, of which longer life and more satisfactory performance may be expected. What has been accomplished is well brought out by the fact that in revising the rear end drive and suspension 42 pounds have been added to the frame and axle members for the sake of greater strength and rigidity, but through other refinements which have deducted considerable weight, the chassis but two pounds heavier than previously.

Longer Springs Used

The changes are largely concerned with the rear end of the chassis and are due to the adoption of Hotchkiss drive, stronger rear axle, heavier frame, hand brake on the rear of the transmission gearset, and consequently an entirely new layout of brake actuating linkage. At the same time there have been a few other changes at miscellaneous points throughout the entire car, although the power plant has been but little affected. The bodies are so extensively refined that they may be really classed as entirely new.

In the adoption of Hotchkiss drive, the torque member has been abandoned and longer semi-elliptic rear springs are now used. These are 58½ in. in place of 56 in. The spring width has also been increased ¼ in. and is now 2¼ in. The front rear spring hanger has been strongly reinforced to take the drive of the car, and there is now a bracketed cross-member at this point to provide



At the left is shown a new Chandler model and at the right the entirely redesigned Elgin

additional support and give a high factor of safety.

There is also another tubular crossmember on the rear end of the frame which not only increases the rigidity of the frame, but also acts as an additional support to the rear tire carrier brackets. The changes which have been made in the rear axle are claimed to have increased the strength of that unit by 27 per cent. The pinion and shaft are now a one-piece forging, eliminating the usual key, nut and cotter pin mounting. The pinion bearings are now Timken tapered roller in place of annular ball and the mesh between the pinion and ring gear is now adjustable from the exterior of the housing. The differential is now mounted on Timken bearings instead of ball. Annular ball bearings are now used in the rear wheels and in transmission bearings and Timken bearings are continued in the front wheels.

Entirely New Elgin

ELGIN is exhibiting an entirely new model at the show this year. A cutout chassis and touring car are shown, although the new car will not be in production for several months. The new car is of the Brush design, with an increase in power from 37 to 46 brake hp., a gasoline mileage of 30½ m.p.g., a turning radius of 18 ft., and a chassis which requires no lubrication.

Among the other major specifications of the new Elgin are the following: Full pressure feed lubrication through a hollow crankshaft, double transverse semi-elliptic rear springs, Columbia front and rear axles, aluminum housing on clutch and gearset to reduce weight, transmission brake, light channel steel third member, "never oil" bushings on springs, hangers, brake shafts, etc., one-piece windshield, etc. The wheelbase is 118 in. and the car has 32 by 4 in. cord tires. The five-passenger touring will sell for $1295, the scout and two-passenger roadster for $1345. The sedan and coupe price is $2195. A complete description of this car will appear shortly.

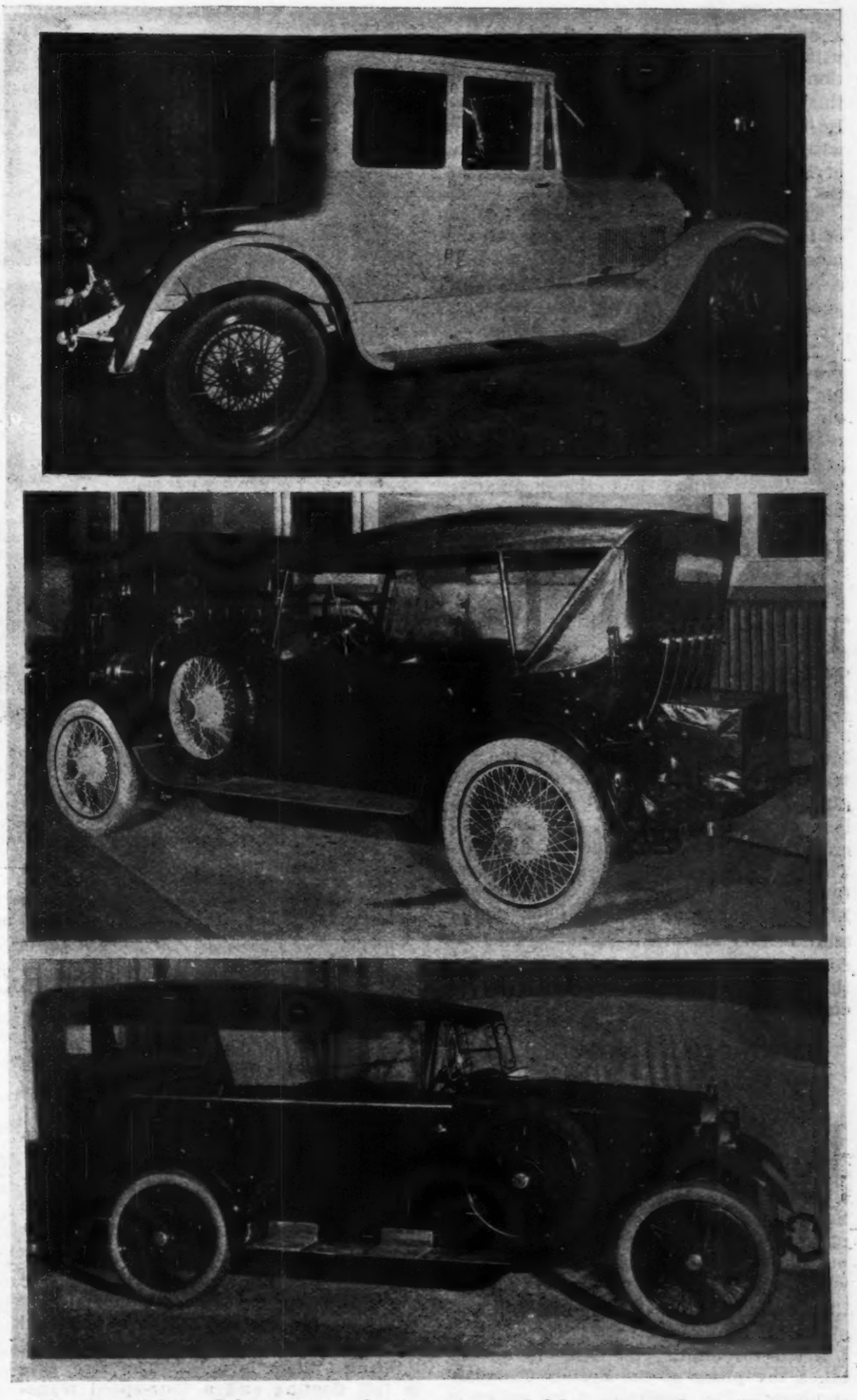
Stutz Has Left Drive

FOR the first time in history the Stutz company is showing cars with left-hand drive. This is significant with the announcement that numerous of the European cars are changing from right to left-hand drive. But Stutz is making the drive optional. The left-hand drive is shown to advantage in the new enclosed custom built sedan and coupe.

The white coupe in the Stutz exhibit has all the earmarks of the Stutz open models, even though it must be inserted into the new and original enclosed car class. The lines of the coupe are low and racy in appearance, with a tire-carrying deck in the rear.

With the maroon seven-passenger sedan, shown for the first time, the Stutz company has shown its ability to carry out the unusual appearance in their enclosed models.

California tops have been added to the Stutz touring models for those who desire them, and they have many features of construction, among them a convenient slide window for signaling.



New Stutz left-hand drive coupe—Lexington new model touring and new Westcott touring model at bottom

Westcott Displaying New Series

WESTCOTT is displaying for the first time its new series, model A-44. This is a five-passenger touring model, and has a wheelbase of 120 in. Among its specifications are listed the following units: Continental 7-R engine, Timken axles, Delco electric system, Borg & Beck clutch and Warner transmission.

An aluminum molding extending around the top of the body adds

beauty. The top is of the permanent type and is lined. Closely fitting curtains with plate glass can be secured, in addition to the regular type. Lubrication of this car is by an oil pressure system. It is a matter of a few minutes' work, without the usual disagreeable features of lubrication, to go over every part of the car.

The runningboards are metal instead of the usual wood, giving a stronger and more permanent board. The leather is a hand-crushed material, better looking and better wearing. The entire steering wheel and spider is made of walnut.

The special touring model follows the same general lines as the standard touring. Spare tires on this car are carried on the runningboard instead of in the rear, and a trunk rack is used instead at the back of the car. The radiator is in German silver and the headlamps nickeled.

Rotary Six Used Distributer Valve

THE Rotary Six, another newcomer at the the show, is a 130-in. wheelbase car fitted with an engine having an overhead rotary distributer valve. This distributer valve essentially is a shaft about 3 in. in diameter, having depressions cut into it to form the passages for the entrance and exit of the gases. The engine, owing to the overhead valve layout, is necessarily quite high, and the hood on this car gives evidence of this fact. The car is to sell for $6000. Other features include Columbia axles, Brown-Lipe transmission, Borg & Beck clutch and metal universal joints. Only a seven-passenger touring car is shown, this being fitted with wire wheels, which come as regular equipment.

Many Refinements in New Model Nash

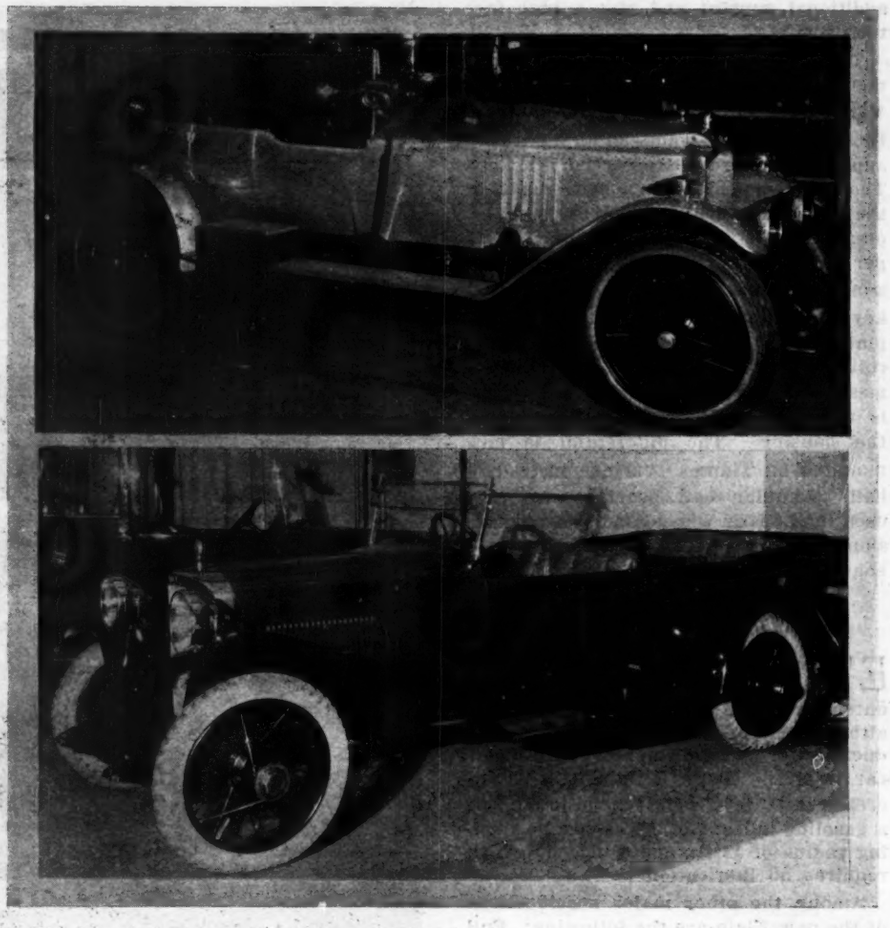
REFINEMENTS have been made throughout both the Nash six and four-cylinder chassis, and on both a new and revised line of bodies have been mounted. The six-cylinder power plant has not been altered fundamentally, but there have been a number of changes which affect the handling of the fuel and the auxiliary units, such as the fan and electrical equipment.

Delco three-unit electrical equipment takes the place of the system formerly employed. The generator drive pulley is now drop forged and machined all over. The fan, which is on the front end of the generator shaft, is now a die casting in place of the sand casting formerly employed, and more satisfactory performance and longer life is secured by putting the fan and generator in strict running balance in assembling the engine.

A change which has been made in the interest of service accessibility is the making of the crankshaft drive pulley in two parts, permittingof the replacement of the belt without taking off the radiator. The belt can now be slipped off overthe fan by disassembling the crankshaft sprocket, and in reassembling the belt can be fitted over the fan and the other half of the crankshaft sprocket fitted into place.

Hot Air Stove Used

A new hot air stove has been adopted. This a Venturi-shaped opening which points toward the rear. It has been adopted in view of a desire to reduce the amount of road dust which finds its way through the carbureter and into the combustion chamber. As the dust passes through the radiator the inertia of the larger particles will carry them past the Venturi-shaped horn of the hot air stove so that in this way a part of the usual accumulation will be eliminated. It is also claimed that when the other particles strike the heated exhaust they will drop and consequently be eliminated from the incoming air stream. The car-



The Vauxhal at top, shown this year for the first time, is distinguished by its long low lines. The other car is the Itala, made in Italy, also making its debut. It has a rotary valve engine

British Concern Exhibits Two Models

VAUXHAL, a well-known British motor car concern, is showing for the first time, at the New York show, a five-passenger open model and five-passenged enclosed model. Both are very low built cars, the open model especially being of rakish design.

The engine of Model D, the touring, is a four-cylinder, 3¾ by 5 in. bore and stroke, fitted with pump cooling, force feed oiling direct to bearings not through a hollow crankshaft. The valves are of the poppet type, located on the left side of the engine. Ignition is by a Watford magneto and a C. A. V. starting and lighting system is used. The rear axle is full floating and a four-speed transmission gearset is fitted. Tires are 33 by 4 in. The Model E has a four-cylinder engine, 3⅞ by 5⅞ in., and tires on this model are 32 by 4½ in. Wire wheels are stock equipment.

The touring car has many novel features, among them being a combination runningboard and toolbox, sunken floor boards in the tonneau, which, with low seats, afford comfort. Individual fenders, without balances, give access to the frame brackets, brake rods, etc., and a brass plate fastened to the inside of the dash has etched upon it a diagram of the chassis to help the owner in oiling, etc.

The company already has a factory branch in Toronto, and expects to merchandise the car extensively. Prices are as yet a little uncertain.

bureter air spring has now been enclosed to give it longer life.

The bodies and equipment on both Nash models have been improved materially. A gasoline gage has been placed on the dash of the six. A new two-passenger enclosed body is now provided on the four-cylinder chassis. It has a permanent leather-covered top and is virtually an enclosed roadster. It has a large luggage compartment under the rear deck, and there is a compartment also for small parcels at the back of the seat.

Itala Has Rotary Valve Engine

THE Itala, a car built in Torina, Italy, is making its debut at the New York show. A four-passenger, sport touring and sedan are shown. The car is featured by a rotary valve engine and clean chassis design. One of the accessibility features is the engine of the instrument board in such a manner so that it readily can be lowered, exposing all wires, switches, gauges, etc. The engine in the sedan is a six-cylinder, while that in the touring car is a four-cylinder, the latter, by the way, having poppet type valves. Wire wheels are stock equipment on the roadster and wood wheels on the enclosed model.

Crow-Elkhart Changes Axles

THE Crow-Elkhart models are continued almost without change, but Columbia axles now are used in all models. A new sport type touring car is added to the regular line, and this follows very closely along the line of the standard model, except that the equipment is more complete. The car has aluminum steps instead of a runningboard.

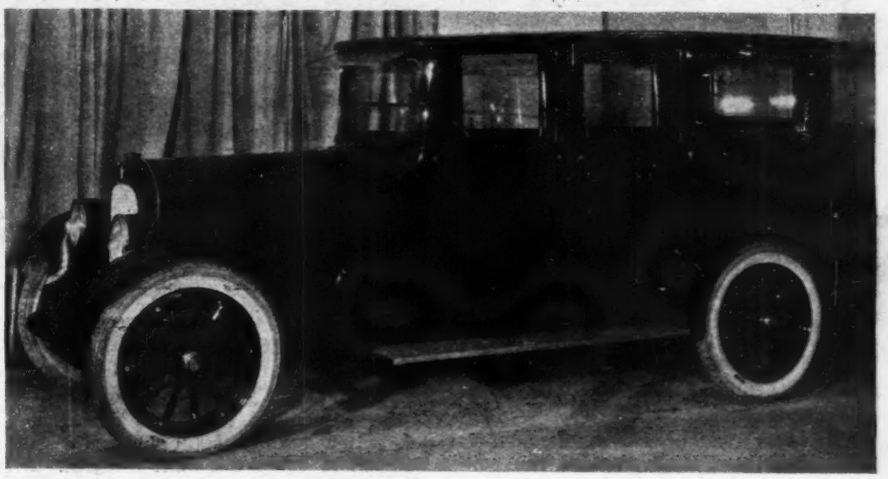
Mercer Increases Equipment

MERCER cars for 1922 are continued with refinements in minor details. The equipment of the car is increased. Those models which have wire wheels as standard equipment carry two extra wire wheels complete with cord tires. Those models which are regularly equipped with artillery wheels carry two extra rims with cord tires. All models have nickel plated radiators and headlamps.

Hupmobile Roadster-Coupe Utility Car

AMONG the utility closed cars at the show is the Hupmobile roadster-coupe, a new model just added to the Hupmobile line. The new roadster-coupe is designed to have all of the advantages of the regular coupe at less cost. The body provides unusually ample carrying space, in its two compartments, for such things as brief cases, sample cases, and personal luggage. The comfort of the roadster body is retained by utilizing the same dimensions, seat cushions and backs.

The body framework also is of the same hard wood, covered with metal, and painted and varnished to a high finish. Above the center line, it is covered with a waterproof fabric. The windshield is practically the same as in the standard coupe. It is watertight and its stanchions, an integral part of the body frame work, are permanently bolted to the roof. The doors also are of regular closed body construction, and made thin to give maximum seat width. The plate glass windows lower completely into the door for ventilation and weather protection. Leather upholstery and gray top are used in the interior. Illumination is furnished by a dome light and the instrument board light.



New Durant Six Sedan with Ansted Engine

SHORTLY after the formation of the Durant Motors Corp., it was announced that the new concern had taken over from the General Motors Corp., the business of the Sheridan car, which had been manufactured for a short time at Muncie, Ind. Under Durant ownership the name of the car was changed to that of the Durant Six and the machine was completely redesigned, so that while the new model is of the same general class as the Sheridan it has little else in common with it. The new Durant Six will be put out in four types, a roadster at $1600; a touring car at $1650; a coupe at $2250, and a sedan at $2400.

Ansted Engine Used

Being equipped with the Ansted overhead valve six-cylinder high speed engine, the new car is decidedly powerful and speedy. A detailed description of the Ansted engine has already been printed in MOTOR AGE, and it is therefore unnecessary to fully describe this component here, but it may be pointed out that it has cylinder dimensions of 3½ by 4½ in., giving it a piston displacement of 224 cu. in., and while the N. A. C. C. rating is only 25.4 hp., the engine is said to develop 70 hp. at 3000 r.p.m. on the block.

A mechanical feature of the Ansted engine is the rocking chair tappet lever, the leverage of which increases as the valve opens. The valve lift is 7/16 in., and it is claimed that the rocking chair type of tappet lever makes possible noiseless operation with this rather high lift.

Fuel is carried in a 20 gal. tank at the rear of the frame, which is suspended from a tubular cross member at the very end of the frame, this cross member also serving as a guard for the tank. The fuel tank is provided with a tank gage and with a two gal. reserve compartment. Fuel is fed to the Rayfield horizontal type 1½ in. carbureter by the Stewart vacuum feed system. There is no inlet manifold, properly speaking.

Special Tire Carrier

The springs are semi-elliptic all around. The front ones are 37⅝ in. long by 2 in. wide, and the rear ones 56⅛ in. long by 2 in. wide. Leaves are polished and graphited and the eyes are bronze bushed. The wheelbase is 123½ in. The wheels are of the wood artillery type with steel felloes. Wheel pullers are provided as an integral part of the rear wheel outer hubs.

Tire equipment consists of 32 by 4½ in. Fisk cord tires with nonskids at the rear. A special design of tire carrier is secured to the rear cross member of the frames and is so arranged that a second tire can be mounted if desired.

The car fully equipped weighs 3,350 lbs. and can be turned around in a 42 ft. 8 in. radius.

The bodies are of the steamline reinforced type, upholstered in hand-buffed leather over curled hair and long springs. There are etched aluminum scuff plates under all doors. The windshield is of the rain-vision ventilating type, affording clear vision in all directions. The panels are provided with rubber extensions and an improved windshield cleaner is furnished. The top is of double waterproof texture and provided with a large plate glass window in the rear.

Greater Values at 1922 Gotham Motor Show

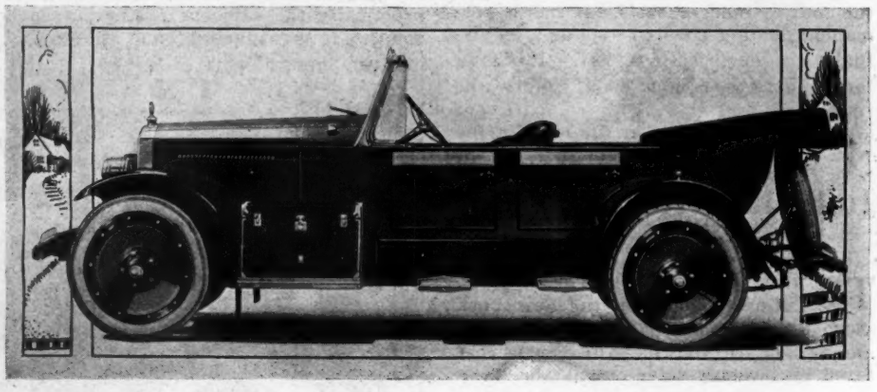
Auburn Brings Out New Sport Model

AUBURN introduced its new sport model at the New York show. This is notable for the completeness of its equipment, and its price, $2195.

The standard 6-51 chassis is used. There are, however, in addition to the regular chassis equipment, four shock absorbers and a muffler cutout.

A special sport body has been designed with high cowl, low sides, wide paneled doors and low inclined cushions. The radiator is nickel plated over a brass shell. A bar filler cap, together with a motometer, is part of the equipment. There is a cowl ventilator. Upholstering is of genuine, semi-dull, long grain, black leather.

Individual fenders are used, and polished aluminum steps replace the conventional runningboard. A black trunk with nickeled trimmings is carried on each side of the car; each trunk is fitted with a suitcase. Headlights are of barrel design, 11 in. in diameter. These headlights are full nickel finish and are mounted in brackets of Sterlite, a white metal that will not corrode or rust.



The windshield is low in design and has polished white metal side arms. Side windshield wings are built integral. All metal parts of the windshield and wings are made of Sterlite.

On the floor of the rear compartment is a beveled footboard which opens and reveals a generous container for luggage. Along the edge of the body there is a polished aluminum body molding.

The top is of double texture top material. The slat irons are nickel plated and the bows are mahogany finish.

Five Disteel wheels and five 32 by 4½ cord tires are part of the equipment. The extra wheel and tire are mounted at the rear. There are spring bumpers both front and rear.

Oakland Has Many Body Refinements

THE five new Oakland 6-44 models shown for the first time at the New York show have distinctly new body lines. A higher radiator, hood and cowl, together with noticeable body refinements, are in evidence.

The engine is of the six-cylinder overhead valve type. Improved pistons and piston rings have been added, and the cylinders are honed to insure an individual fit. A Morse silent chain drive is used at the front end of the engine, insuring freedom from noise and excessive vibration.

Drum Type Headlights

Drum type, non-glare headlights, with exterior means for focusing, are standard. Nickel plating is used on the radiator and other parts of the car where it adds most to the appearance. Oakland is continuing the policy of individually tailored tops and curtains, and in the open cars the curtains open with the door. Rear windows and windshields are of plate glass, and in the enclosed models there is plate glass throughout. Heater, rear view mirror, visor, windshield wiper and snubbers are furnished in coupe and sedan. The wheelbase is 115 in.

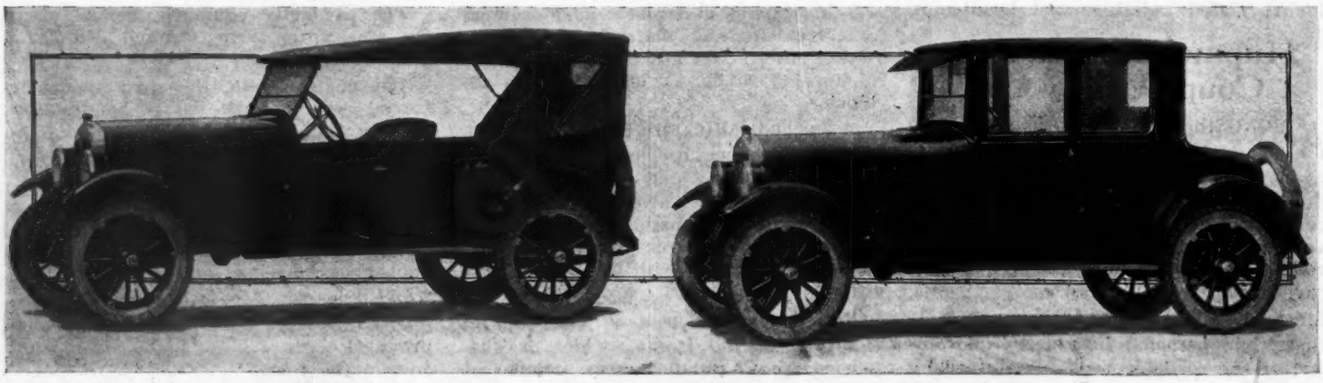
Doors are full square, with wide openings and handles inside and out. Locks are provided on all door handles in enclosed models. Door frames are metal covered to insure smoothness and all hinges are concealed. In the enclosed models care has been given to the seating arrangement and the space inside has been cleverly utilized for convenience in carrying packages and luggage.

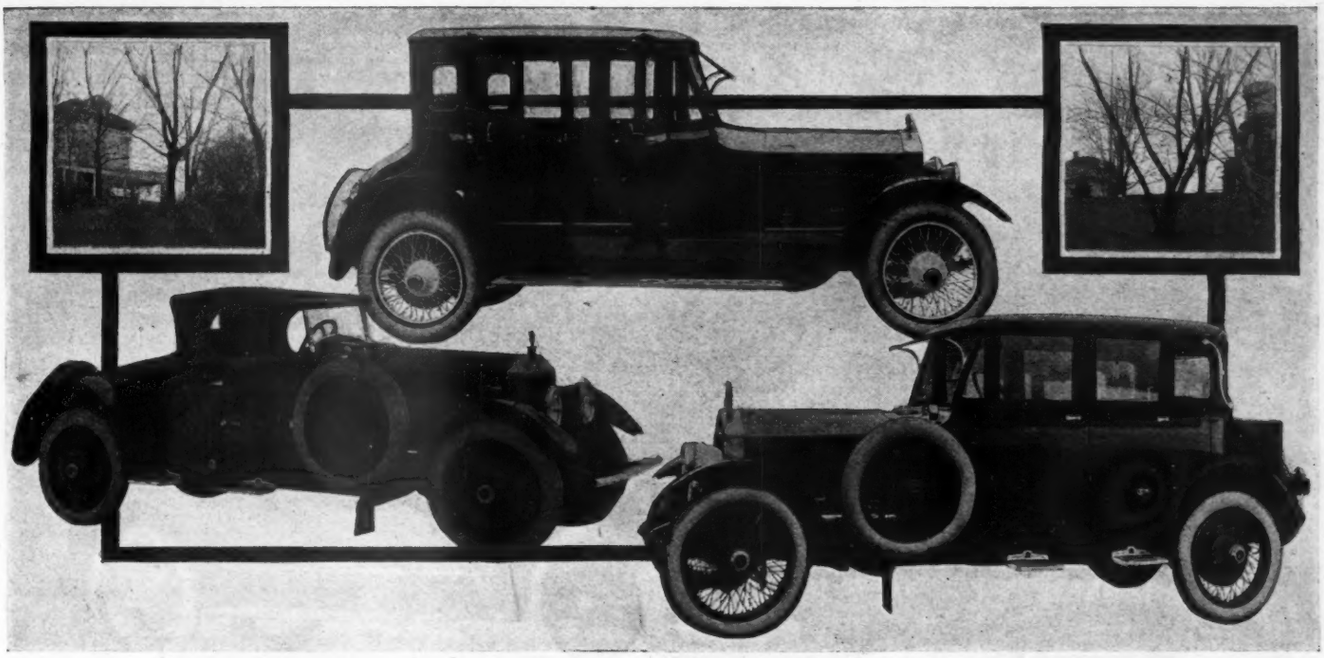
In the coupe and roadster, the rear decks conceal ample storage space, and back of the driver's seat is a convenient space for carrying small articles. In the touring car there are pockets in all doors and ample carrying space for tools, luggage and curtains, under both front and rear seats.

Instrument boards are of walnut, all instruments being faced with silver and under glass. A new and convenient grouping is made this year, looking to easy visibility at night.

Nonskid Cord Tires All Around

Another innovation in Oakland equipment on the 6-44 is that 32 by 4 in. nonskid cord tires are furnished all around. The touring car and roadster, coupe and sedan are finished in blue-black. The sport car is finished in maroon, with black running gear and white wire wheels. Touring car and roadster are upholstered in genuine black leather. The sport car is upholstered in brown.





Roamer Has New Bodies at New York National Show

A SPEEDSTER, four-passenger sport model, four-door coupe, sport sedan and four-passenger touring car are being shown by Roamer.

The two-passenger is not a new model, although there has been an improvement in the engine. The four-cylinder Rochester Duesenberg engine, with a bore of 4¼ in. and stroke of 6 in., is now used in this car exclusively. This engine is the G-2 type developed as a result of the Roamer speed trials on Daytona Beach, Fla. This car also has a Brown - Lipe four-speed transmission, four speed ahead and one reverse. The drive is direct on third speed with the fourth overgeared 1¼ to 1.

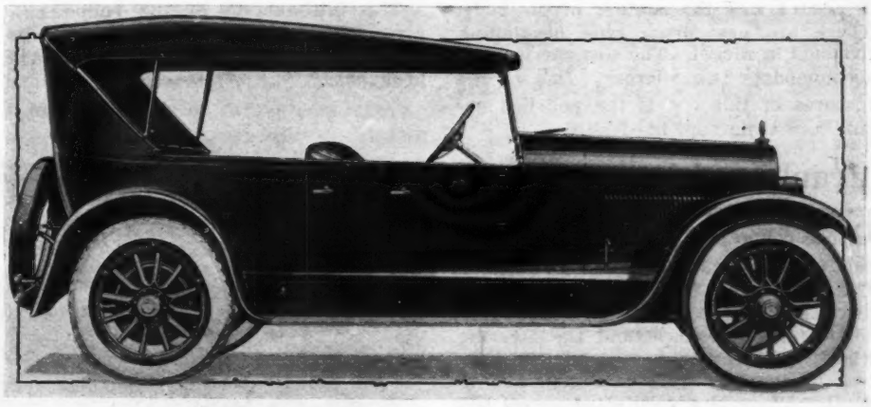
A feature of this car is the movable rear deck, under which is concealed a snug fitting top which can be easily raised. There is also an ample luggage compartment under the rear deck.

The four-passenger sport model is fitted with either Duesenberg or the six-cylinder Continental engine. A feature of this car is the disappearing tonneau windshield.

The four-door coupe is an entirely new model and is the first four-door coupe ever manufactured by this company. This car is equipped with a six-cylinder engine having a bore of 3½ in. and a stroke of 5¼ in. This car not only has the advantage of the four doors, which permit passengers to get in and out of the rear seat without disturbing those in the front seats, but also has a body which is 4 in. longer than the old body.

The four-passenger Duesenberg sport sedan is the first car ever put out by this company as exclusively Duesenberg-powered equipment. The outstanding difference of the body lines of this car from other Roamer enclosed cars is the rounded top corners and straight lines of the back, which drop to a trunk platform in the rear of the body. The equipment of this model is distinctive and complete.

Vesta headlights with cowl lights and tail lamp to match, side spare wheel mountings with two extra wheels and tires, and also an extra wheel and tire in the rear, cowl ventilator and a genuine leather three-suitcase compartment trunk is included in the equipment of this particular car. Individual steps, polished nickeled bows on either side of the top add a further touch of distinction to this job. Another feature is the heavily grained black fabricoid covering of the top and side panels above the window line. The car displayed is painted a Petain gray with black upper panels above the window line, and black fenders. The wheelbase of all these cars is 128 in.

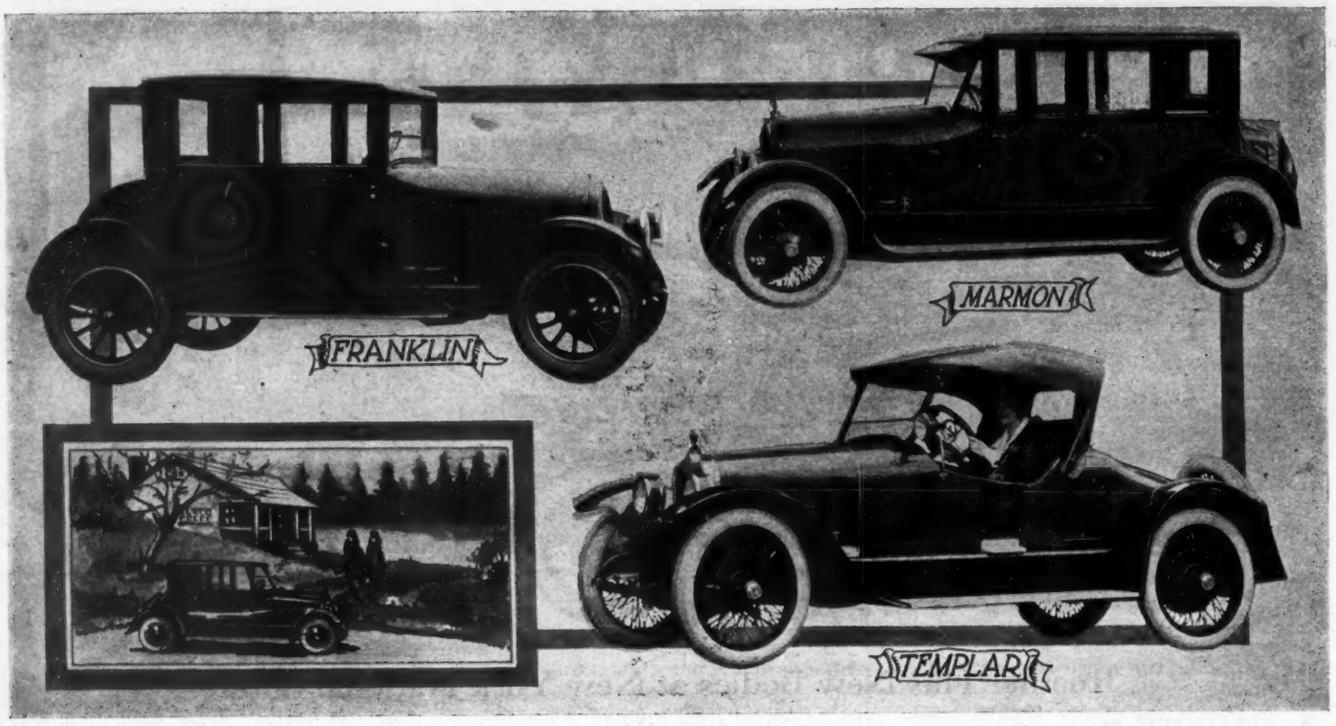


Case Has a New Five Passenger Car

CASE has a new six, known as the model X. The car is low, only 74 in. high with the top raised. The wheelbase is 122 in. and 32-in. wheels are used. This model is furnished in two body types, a five-passenger touring and five-passenger sedan.

The model X has a wide speed range of two to 70 miles per hour in high gear, it is stated. It accelerates from five to 20 m.p.h. in 6½ seconds. The Case Continental engine develops 55 hp. at 2600 r.p.m. Road clearance has not been sacrificed in securing lowness, as a full 9½ in. clearance is maintained at the front axle, the lowest point of the car. The rear of the frame rides easily between long springs clamped above the axle at the extreme ends of the housing. The resultant wide spring tread and low center of gravity give stability.

The fuel consumption is low, about 18 miles on a gallon of gasoline being claimed. The capacity of the 4½-in. cord tires is 4800 lbs. Large bearing surfaces, provision for ample and positive lubrication, oversize gears, brakes of unusual size and effectiveness are factors in the new model.



Templar Adds a Touring Roadster

TEMPLAR has added a new model two-passenger to its line. The car has a wide door opening on the right-hand side, deck countersunk for a circular trunk, the latter being covered with the same material as the top. The top is modeled in accord with the contour of the body. There are new drum type headlamps, trimmed in nickel. The tire carrier will accommodate two spares. One of the features of this car is the polished engine and aluminum hood sills.

Franklin Lists a Coupe

FRANKLIN is showing a new coupe. The coupe is a compact enclosed car, comfortably seating four passengers. The driving seat, easily accessible through either door, is large and very comfortably placed behind the steering wheel. The rear seat is good width for two adult passengers and generous in depth. There is a good sized parcel box to the left of the rear seat, and room for luggage in the deck, which is provided with a water-tight lid.

The windshield is the straight-front type, top section hinged, lower section fixed and leak-proof, ample ventilation being obtained through large side-cowl ventilators. Instead of the usual outside visor, fixed or movable, an inside adjustable eyeshade is provided, saving the trouble of getting out of the car for adjustment and allowing a clear-height vision through the shield when not needed.

Silk shades draw over the quarter and rear windows. Dome light and other interior mountings are finished in dull platinum. The upholstery is in neutral green broadcloth, plain plait in design, cushions made up on lace web springs, all garniture being silk and worsted lace.

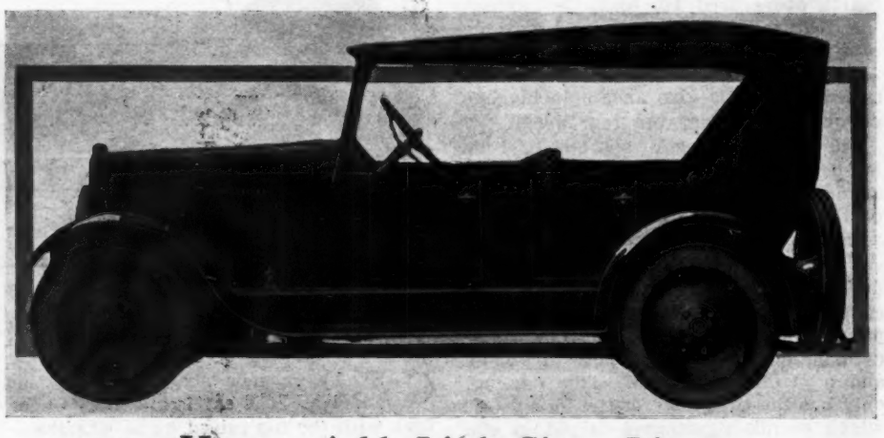
The left door locks from the inside, the right from the outside, with a Yale lock and key. The slatted and padded roof construction is sound-proof in itself and effectively deadens vibration noises.

The introduction of the coupe now gives Franklin three enclosed cars in its line, other types being the sedan and brougham.

Buick Has a New Roadster

A NEW Buick roadster, known as the Special 6-54, made its debut at the show. It is built on a big chassis, with 32 by 4½ cord tires, and a gear ratio of 4 1/3 to 1. It is fitted with soft, easy-riding springs and snubbers front and rear, and carries many conveniences in the form of attached accessories.

The body is enameled in maroon, with black fenders and red wire wheels. The



Hanson Adds Little Six to Line

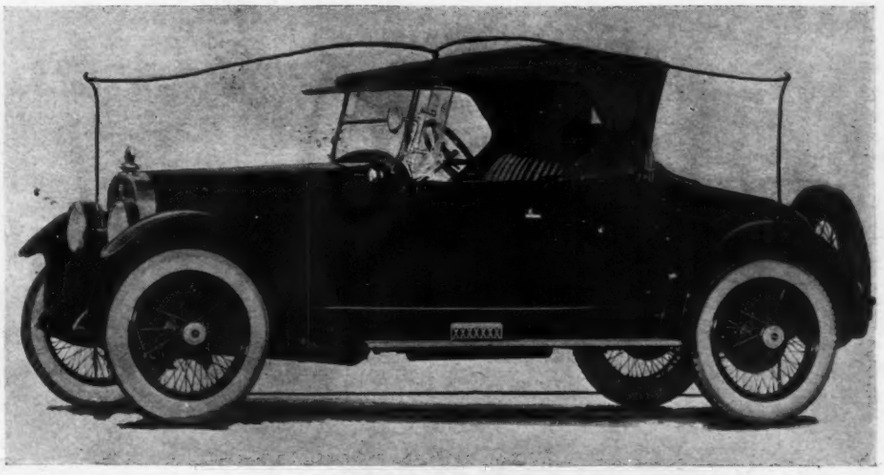
A NEW light six-cylinder car is being shown by the Hanson Motor Co. In many respects the car uses the same units as the larger Hanson model. The little six is a 112-in. wheelbase job, seating five passengers. Upholstery is of long grain leather. The frame is quite deep for so small a car, having a six-inch depth. Both axles are Timkens, the brake drums being 14 in. in diameter.

A feature which makes for easy riding is the use of 54 in. rear springs, which are underslung from the axle. Disk wheels are regular equipment on the new model. The car at theshow has a special Hanson engine, but at this writing it is uncertain as to whether it or the Continental will be used. The car sells for $995 f.o.b. Atlanta, Ga.

top is of khaki, with nickel and leather binding, and nickel finish is repeated on the radiator, windshield wiper, spotlight, deck rails, runningboard binding and hood fasteners. Etched aluminum threshold plates are furnished, with the runningboard step plates of rubber and nickel silver guards on the side apron Lamp equipment consists of drum type headlamps and cowl lamps.

Walnut is used for the steering wheel, control lever ball and horn button. The toe and floorboard carpets are removable and there is a trap door in the floor for keeping the battery water at proper level, a good maintenance feature. The door locks with a Yale lock. Transmission control and emergency brake lever are nickeled.

Exterior accessories and conveniences include a spare wheel carrier, adaptable for two wheels, and rear fender wings designed to keep mud off of the rear deck. There is a large luggage compartment in the rear deck and the gasoline tank filler is on the right-hand side, for convenience. The large back curtain light is of beveled plate glass and the side curtains are equipped with weatherproof curtains, clear vision lights and signal pocket. A tool pocket in the left-hand door and a side curtain pocket in the right-hand door are conveniences.



Special Buick roadster 6-54 making its debut at the New York show

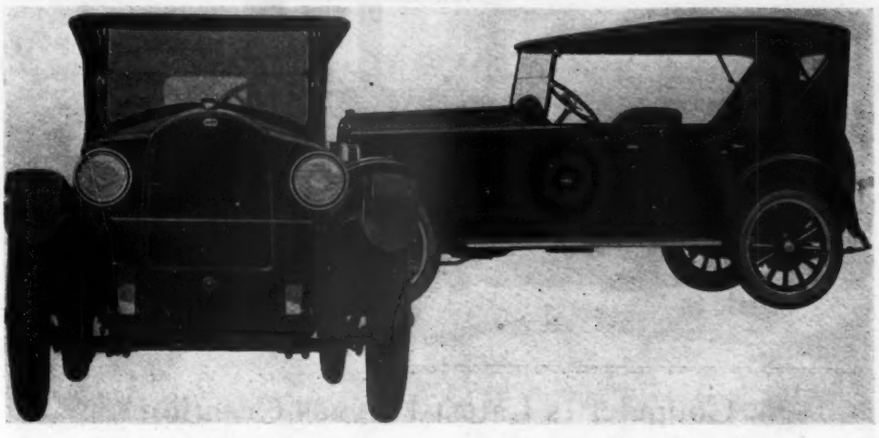
There is an adjustable sun shade attached to the windshield post, and it can be used even when the top is folded, but is easily removed. Nuts to adjust the positions of the windshield are readily accessible on the inside of the post. Adjustable windshield wings of beveled plate glass are in keeping with the other conveniences, and a neatly arranged instrument board, trimmed in leather, is equipped with combination lock and speedometer; combination oil gage, ammeter and gasoline gage; ventilator control for cowl ventilator; cigar lighter; instrument lamp, and spotlight switch. An adjustable rear vision mirror, mounted on the windshield, completes the list of accessories and conveniences.

Marmon Introduces Four-Passenger Sedan at Show

THE latest of the new enclosed cars recently introduced by Nordyke & Marmon Co. and formally presented at the New York show, is the four-door, four-passenger sedan.

Like the other new enclosed bodies, the four-passenger sedan is the product in its entirety of Marmon design, facilities and workmanship. In outer appearance, the sedan is similar in its lines to the seven-passenger sedan, with the exception of the trunk placed on the rear. There is the same quality of lowness and light weight that are distinctive of this group, and the same windshield design, tending to facilitate the matter of road visibility for the driver.

In interior appointments, there is no departure from the design of the other enclosed cars, with the exception that there is but one dome light and that the footrest is stationary. The rear seat, intended primarily for two, is only slightly less than that of the seven-passenger sedan, so that comfort is assured.



New Car Sponsored by Jewett

THE Jewett will be built and marketed by the Jewett Motors subsidiary of the Paige-Detroit Motor Car Co., in the Paige shops. It will be sponsored by H. M. Jewett, president of the Paige organization, after whom it is named.

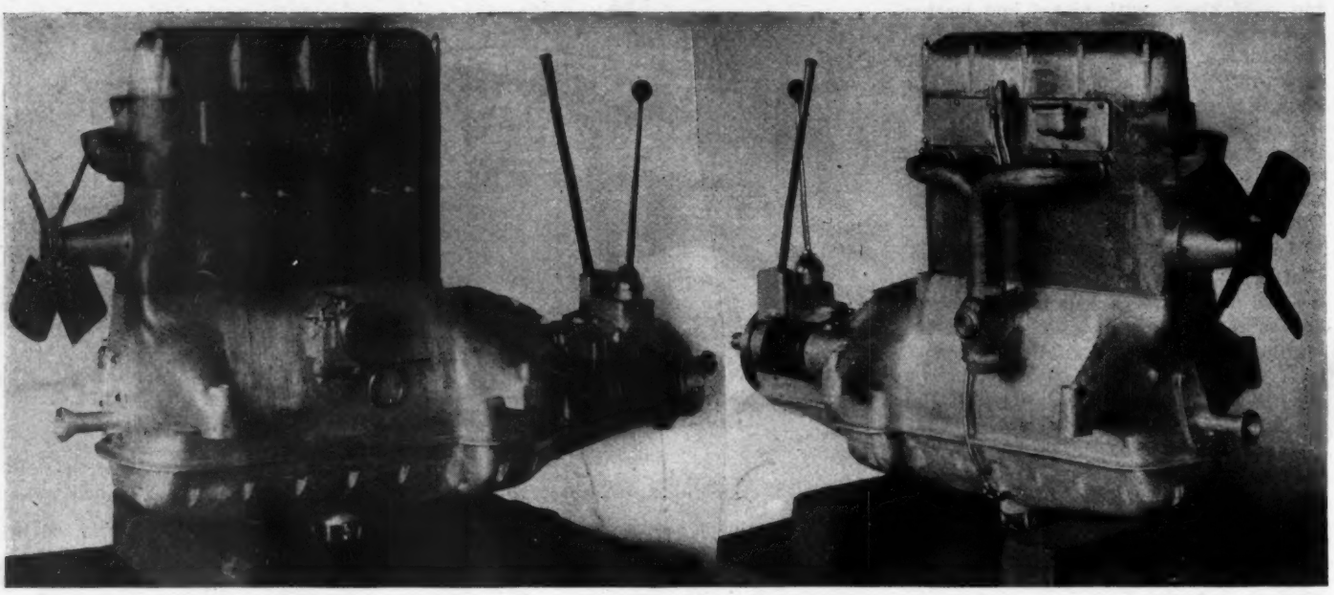
The new car is a six with a 112-in. wheelbase. It is equipped with a 3¼ by 5 in., L-head motor, with an S. A. E. rating of 25.35 hp., but actually claimed to show 49 brake horsepower on the block.

The Jewett motor will be built in the Paige power plant. It is a large diameter, three-bearing unit. Lubrication of these main bearings is by oil under pressure. Oil is also pumped to the front and gears and the connecting rod dip troughs. The ignition distributer is provided with an automatic spark advance. Starter and generator are separate Remy units. The generator is thermostatically controlled to prevent battery overcharging. A six-volt Willard battery furnishes current for starting and ignition.

Cooling is by centrifugal pump. A four-bladed fan is driven by a flat belt from the pumpshaft. The clutch is a four-plate, dry construction, departing from usual practice by using six helical springs for compression set out toward the periphery of the clutch plates in place of one. These are claimed to give a more even clutch engagement regardless of clutch alignment, eliminating any tendency to grab or chatter and making adjustment unnecessary.

A conventional type transmission is used with three forward speeds and reverse. A transmission lock built into the cover of the gearbox and controlled by a Yale cylinder positively locks the gearshift lever in neutral, thus preventing theft of the car.

A tubular drive shaft with two universals transmits power from the gearbox to the rear axle. An all-metal universal joint of very clean design is used. It consists of a hollow ring through which the torque is transmitted and which encloses all the working joints. This ring forms a container for the necessary lubricant as well as a dust cover, making care of the joint a simple matter of removing the oil in the joint every 20,000 miles.



Two views of the Frontenac engine. It will be observed that the carbureter is on the left side, the gas flow going through the crankcase and up through the intake manifold on the right side. The manifold is exhaust heated at the bottom. Starting motor and generator are on the gearset

New Frontenac Design Original

Louis Chevrolet and C. W. Van Ranst Develop Engine Which Reflects the Lessons Learned in Speed Contests. Overhead Camshaft and Four Wheel Brakes Employed

THE new Frontenac, the engine of which is exhibited at the Hotel Commodore, incorporates many unique features of design. The car has been designed by Louis Chevrolet and C. W. Van Ranst, who has been associated with Chevrolet on the racing cars. It is of original design throughout, incorporating an overhead camshaft engine, four-wheel brakes and many other departures from usual practice. In spite of this, the designers claim that the car will be in the $2000 class when it is put on a production basis—which, they state, will be in the spring.

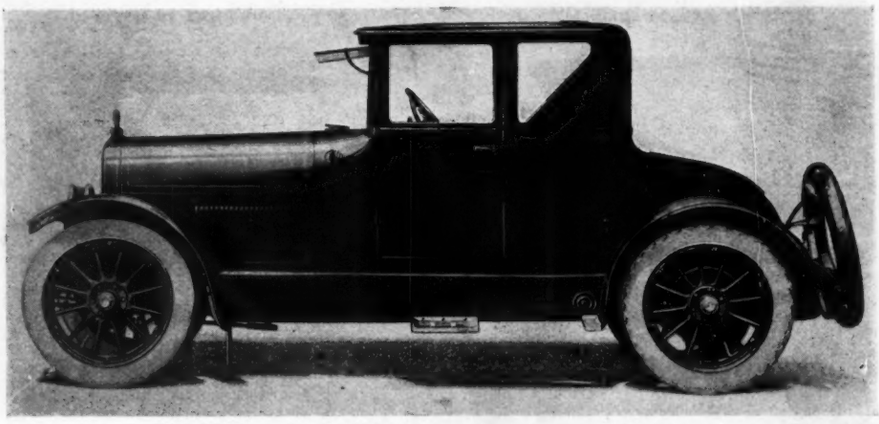
The engine is a 3⅜ by 5½ in., four-cylinder, block cast, overhead camshaft unit powerplant type. The cylinder head is cast separately from the block and the crankcase also is a separate aluminum casting with a pressed stell bottom pan.

Interesting Camshaft Drive

The crankshaft is three-bearing with 2 1/8, 2 3/16 and 2 1/4 in. diameter at front, center and rear bearings. The lengths of the bearings are respectively 3, 2½ and 3⅞ in., front to rear. The crankshaft is a plain disk type, the end thrust being taken by the center bearing and .005 in. end play is allowed in the crankshaft.

One of the features is the camshaft drive. This is by means of two chains through a relay idler, permitting the reduction to be stepped up and, consequently, reducing the sprocket size. The chain employed is the Link-Belt unit type, with a spring idler take-up. The overhead camshaft is hollow and mounted on three bearings. The cams are pierced with oil holes at the point of commencement of the lift.

The camshaft chamber is oil tight and separate from the valve chamber.



Coupelet Is Latest Haynes Creation

THE new Haynes 55, three-passenger coupelet, is presented for the first time at the show. The three passengers ride side by side on the wide, deep, 52-in. seat. The interior is ventilated by means of a roof ventilator, a cowl ventilator and a ventilating windshield. The body is finished in coach blue. Four cord tires, 33 by 4 in., are standard equipment.

A smart carriage effect is obtained in the coupelet by means of the triangular shaped windows at the side, which afford good vision. Exterior side cowl lights beautify the appearance. There is a spacious luggage compartment in the rear deck and a large package space behind the seat. The seat is upholstered in black leather. The remainder of the interior is finished in a durable fabric.

The valve action is by rocker arm to an adjustable tappet which operates through an oil tight bushing. The tappets are hollow steel and the valves open directly into the head. Both the inlet and exhaust valves are of the same size, although the materials differ, high tungsten being used for exhaust and low tungsten for the inlet. The valves are 1 7/8in. clear diameter, with a lift of 3/8 in. and a 30-deg. seat. The stem diameter is 3/8 in. The valves are timed to have the exhaust open at 45 deg. before lower dead center, close at 10 deg. after upper dead center, and the intake opens at 10 deg. past upper dead center and closes at 40 deg. past lower dead center.

High Pressure Lubrication

Lubrication is by high pressure system, normal pressure being 50 lbs. Leads are carried to the three main bearings and from these to the connecting rod bearings. The oil is led under reduced pressure to the camshaft, the leads passing to the center camshaft bearing, where it passes through a small hole, which has the effect of reducing the pressure. There is a regulating valve equipped with a check to keep the oil pump full of oil, and a by-pass to send oil back to the return lead.

Cooling is by thermo-syphon and assisted by a four-blade fan, mounted on the shaft which carries the relay sprocket for the camshaft drive chain. The water passages are large, none being less than 3/8 in. in the coring at any point. The spark plugs are mounted in the side of the cylinder block and are completely surrounded by water.

Ignition is by the Delco system, and both automatic and manual advance are furnished. The generator drive is on the rear end of the transmission gearset, the chain being driven from the rear end of the main shaft; thus it only is in operation when the car is under way, allowing the engine to be accelerated suddenly without danger of stripping the generator drive gears.

Location of Starting Motor

The starting motor balances the generator on the other side of the transmission gearset, leaving the engine clear and also giving a distribution of weight toward the center of the car. Bendix drive and shift is employed on the starter. Another advantage claimed for this location of the generator and starting motor is a decreased length of wiring.

An interesting point in connection with the engine assembly is that the studs for the crankcase and head are screwed into the block, thus eliminating the necessity for solid bosses through the block to take care of continuous stud mountings. Eight 9/16 in. nickel steel studs are employed for the case. There are 13 head studs, 7/16 in. in diameter. The cover of the valve mechanism is of aluminum and is held in place by 10 cap screws.

Gasoline is fed from a 20-gal. tank at the rear of the chassis by vacuum to the carbureter. The make and size of the carbureter has not as yet been determined, but it will be either 1½ or 1¾ in., taking in all cold air. The carbureter is a horizontal type with vertical flange, and the mixture is led through a transverse pipe directly across the block between the two middle cylinders to the opposite side where the heavier gases come in contact with a heated cone which is in contact with the exhaust. The vaporized portions of fuel pass upwards into the tanks. The hot cone vaporizes the heavier particles of fuel, allowing them to join the in-going gases which flow up the vertical intake passage. The cone being on the right side of the engine is in contact with any liquid fuel which drains, due to traveling along the crown of the road.

The clutch is a single dry plate type which will be bought outside, and the transmission gearset is a three-speed type with a double bearing on the rear end of the main shaft to take the generator drive stresses. The halves of the double bearing are placed about three inches apart. One of the features of the transmission gearset is the large oil filler which is located in the front valve cover.

Frontenac Rear Axle

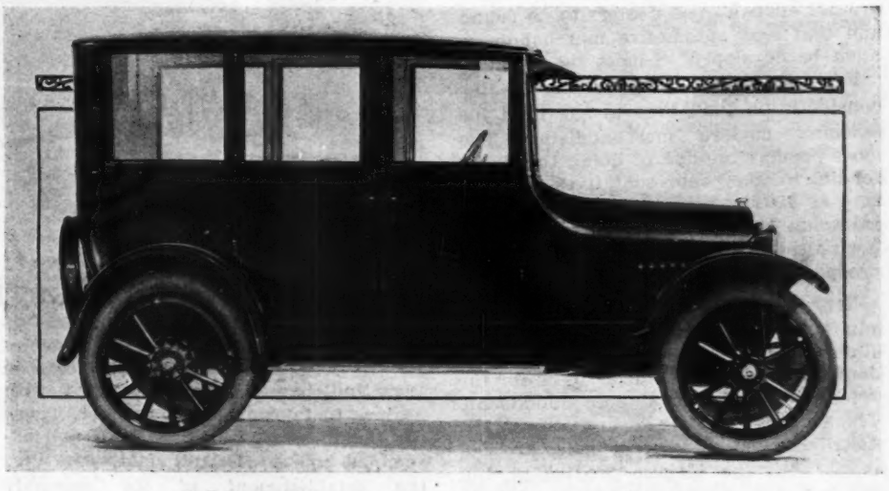
Propulsion is by means of a hollow shaft with two universals. The rear axle is of Frontenanc design with spiral bevel gear. It is a three-quarters floating type with a ratio which will probably be about 4½ to 1. The pinion shaft has a bearing on each side of the pinion and the axle construction is very similar to those used on the Frontenac racing cars. The front axle is an I-beam section and is of the inverted Elliot type. Thirty-two by 4 in. tires are used.

Four-wheel brakes are employed for the service layout and a brake on the rear end of the transmission is employed for the emergency. The four service brakes are all internal expanding shoe type operated by cams. As is usual with four-wheel brakes, the king pins in the front axle are inclined so that if produced they would intersect the ground at the point of contact of tire and road. The four-wheel brake cams are mechanically operated.

The hand brake is a metal-to-metal internal expanding type. The emergency brake ratchet is cast in the cover of the transmission and is so arranged that if the lever is pulled toward the driver, it affords a ready release, so that the lever cannot be jammed on so as to make it impossible for a woman to release the brakes. The lever has direct action to the brake cam piece without exposed parts.

The frame is of deep section, pressed steel with the front springs outside of the frame, like the construction on the Frontenac racer. The springs are semi-elliptic, front and rear.

A full line of bodies will be provided, the open cars to sell for less than $2500. The cars are replete with detail features of interest, such as, for instance, location of the breather, which is in the front inspection cover over the valve mechanism, and the front and timing chain cover carries a cone guide to assist in the easy engagement of the starting crank. A number of details are unsettled at this writing, and the final design will probably not be complete until ready for production.



New Chevrolet Sedan at Show

ONE of the new models in the low-priced field is the new five-passenger Chevrolet sedan, selling for $875. This sedan is of the four-door type, and replaces the former two-door 4-90 sedan. A long list of improvements over the preceding model is found in the new model. The body is considerably lower and is slightly longer. Front doors are hung from the front, and rear doors from the dear. All doors are equipped with safety latches and anti-rattlers.

Two new features which stand out in this job are the removable upholstery in the back of the rear seat, and the one-piece decking material used on the top. If the back of the body is dented in any way, the back cushions can be taken out by removing two screws, thereby saving considerable time and effort in "driving out" dents. The one-piece decking material is drawn down over drip mouldings, and is said to do away with leaky seams, a fault sometimes encountered in enclosed cars. The front seat is undivided.

Notes Gathered From Exhibitors at New York Show

Strong Interest in Dealers Apparent at New York Show—Sales Organizations Being Carefully Developed

THERE have been few shows in the history of automobile expositions in which the manufacturers are more keenly interested in dealers than at the one now in progress at the Grand Central Palace. Competition for successful dealers is almost as keen as for sales. It is realized that the one question is closely related to the other and that the company with a strong sales organization will be the one which will get the business.

Factory sales managers at the show are greeting cordially all the dealers with whom they come in contact and inviting them to pay visits to hotel headquarters where contracts are scanned and the general merits of the factory proposition are considered.

Manufacturers Anxious to Add Dealers

Almost without exception manufacturers admit that they are anxious to make large additions to their dealer organizations. They state frankly there are not enough good dealers to go round and that real automotive merchandisers must be developed to meet the demand.

Factories generally are giving greater consideration than ever to the need for teaching modern merchandising. The most popular method of doing this is by sending factory representatives into the field as district men. Hundreds of these salesmen have been added in the past few weeks and many more are in prospect.

Representatives of a few companies admit that they propose gradually to eliminate distributors, but the preponderance of sentiment seems to be for the retention of the automobile middleman. The manufacturers who are sold on the distributor, as a general rule, are not those with the largest production, but it has become evident that there will be automobile distributors in the business for a long time to come.

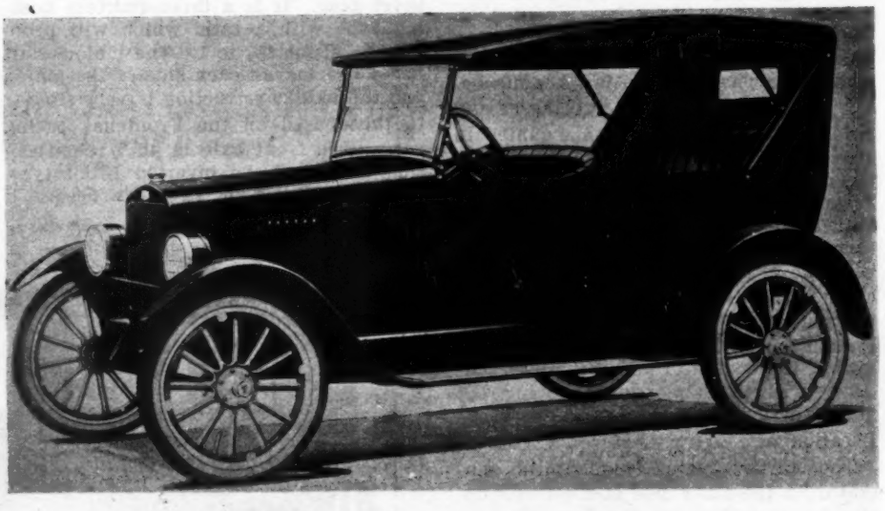
There are several instances of exhibits at the show where new low price models have been brought out by leading makers with the thought uppermost of making a quick cleanup of heavy inventories not necessarily high priced. This will permit the companies to turn into cash these piled up goods, which probably, with only their former higher priced cars to work with, would have taken a year or more to work up.

The new orders will be at prices varying little from the prices to which the inventories have been reduced, and in most cases, any differences, will be due to market variations in the important commodities.

Rotary (Bournonville), a quality job, plans to sell only directly from the factory, and will place no dealers or distributors. This car, however, is made largely to introduce the Bournonville Rotary Valve, and Bournonville admitted that he expected to build very few cars. Kelsey, just going into production, will place no distributors, but will deal through branch houses. Sayers looks with favor upon th establishment of branch houses, but fifteen taking no definite steps along this line as yet. Anderson also plans taking a step of some sort in this connection, but would make no definite announcement. They did say, however, that it was possible that some distributors would be eliminated to make room for branch houses.

Doing Away With Branches

The strongest sentiment, however, was expressed in the opposite direction.



Gray Gives Plan for Low Priced Car

GRAY Motor Corp. will build 23,000 of its new light four-cylinder cars in 1922 and has already contracted with dealers to take over this number. These for the most part will be built and assembled in the Detroit factory. With the establishment of its assembly branches throughout the country the company will go into production on a basis of 200,000 cars a year.

This statement was made at the Gray Motor exhibit in the Hotel Commodore by Frank B. Klingensmith, president of the company, and former executive vice-president of the Ford Motor Co. Twelve assembly stations will be located this year, the cities thus far tentatively settled upon being New York, Philadelphia, Boston, Detroit, Chicago, Minneapolis, San Francisco, Kansas City, Dallas, Atlanta, Columbus and Portland, Oregon. Dealer organizations will also be located in each of these cities.

The price of the car will not be fixed for a month or more, but it will probably be nearer the $400 mark than $500. Klingensmith would not authorize anything more to be said on the price than that "it would be considerably under $500." The show price is "under $500." Klingensmith emphasized the "considerably."

Only two models of the car will be built this year, touring and sedan. Next year will include a complete line. The work of dealer organization is progressing rapidly but in no case yet has the company permitted any contracts to be signed.

Dupont will probably do away with some of its branch houses and place their car in the hands of distributors. Stanley will probably do the same thing. Rickenbacker will have no branch houses, but will deal through distributors. Norma is looking for new distributors and dealers, as are Hanson and Hatfield. Itala, a foreign car, may also add new distributors in this country. Leach Biltwell, a California firm, plans an invasion of middle western and eastern territory, but has not yet decided as to whether or not to deal through distributors or establish branches in New York and Chicago. The latter course will probably be followed if satisfactory men can be found.

While Dorris has opened a factory branch in Philadelphia it is not an indication that the company is adopting a policy of distributorship elimination. To the contrary, it is building up a strong distributor organization.

Hupp and Marmon Enlarge

Pilot is leaning toward the factory branch policy with six branches already opened and more at Pittsburgh, Philadelphia, Boston and Cleveland, under contemplation. Under the company's policy a few distributors will be retained but they will be those that have proved strongest in the organization.

Hupp, which now has 1250 dealers and 90 distributors, expects to increase its dealer organization to 1400, but does not believe it could add profitably more than 10 distributors. Marmon is making an effort to materially enlarge its dealer organization.

The new Fox air-cooled car will be handled entirely through distributors. The Frontenac sales policy has not been definitely determined. The Gray has selected distributors in Boston, Nw York, Philadelphia, St. Louis and several other large cities.

Makers in Strong Position for Production in 1922—Spread Used Car Gospel of "Buy 'Em Right"

THE position of passengercar manufacturing companies in relation to inventories at the opening of the show this year is so much improved over the serious plight they were in at the beginning of 1921 that there is no comparison. Almost without exception factory executives assert that inventories have been liquidated and losses taken. These assertions should be discounted to a certain extent, but it is unquestionably true that most companies have little to worry about so far as inventories are concerned at this time.

There is scarcely a company in the field which is not in the market for small supplies, at least, of parts and materials. These orders will increase as production is enlarged. After a review of the situation at the show, it can be stated safely that the improved position of manufacturers will be reflected from now on in the business of parts and accessory makers.

Many of the factory executives seen at the show declared that price revisions had been made possible by reason of the fact that old and high-priced inventories had been cleaned out. Ability to purchase materials at the market has resulted in a scaling down of prices.

When the show opened last year manufacturers were hopeful that they would be able to work off their high cost inventories without material loss to themselves, but after sales had been at a standstill for three months they changed their minds and began taking their losses. This process of liquidation now has been virtually completed.

The inventory taking period is practically over and nearly all companies know now exactly where they are at in respect to stocks of supplies. They will take steps immediately to replenish these parts of which they are short. Except in the cases of the larger production concerns, buying will continue to be on a hand-to-mouth basis, but it will be for current needs.

There is evident determination on all sides to avoid the loading up with large inventories which has proved so disastrous in the past year and a half.

Most companies are having their distributors call frequentluncheon or dinner meetings of their dealers which are addressed by factory men. These meetings are used to preach the gospel of "buying them right" in relation to used cars. It now is conceded that there is no panacea for the used car evil, and that the only way in which it can be solved successfully is by eliminating losses on trade-ins.

Dealer Financing Not So Serious

The question of dealer financing is not nearly so serious as it was a year ago, but many companies are arranging for the accommodation of their dealers through financing companies. Most of the manufacturers who are sold on the distributor contend that a large proportion of the dealers are unable to finance themselves except for purchases of two or three cars at a time through distributors.

There is apparent a disposition to adopt in dealer contracts the suggestions made by the directors of the National Automobile Chamber of Commerce after a series of conferences with a committee representing the National Automobile Dealers' Association.

What the Manufacturers Think About Business for 1922

NO evidence of false optimism is to be found among automobile manufacturers who are here for the New York show. They have no illusions about what the coming year has in store for them. A few expect sales of passenger cars in 1922 to exceed those of 1921 by about 25 per cent, but the majority believe production this year will be on about the same basis as last year.

While it is the consensus of opinion that there will be no falling off from the production of 1,535,000 passenger cars in 1921, there are many factory executives who believe this output will be centralized in a few factories to a greater extent than it was last year. There is no disposition to wink at the fact that competition will be keener than it ever has been, especially in lines which are in practically the same class. It is felt that if there are further price concessions it will be by rival companies fighting for sales of cars.

Expect Increased Foreign Trade

These companies which have developed an export trade report a somewhat larger volume of actual sales and many more inquiries than have been apparent for several months. They are confident that as the year advances their foreign trade will show steadily increasing volume.

Generally speaking, manufacturers feel that there can be no marked revival of buying until the position of the farmer is materially improved. They point out that a large part of the sales of 1921 were made in a comparatively few cities and that it will be necessary to carry on intensive sales campaigns not only in those cities but in a new territory in the coming year if the sales work of 1921 is to be equalled.

Production schedules for 1922 thus far are purely tentative and all estimates merely are guesses. All manufacturers as a whole will build cars strictly on a sales basis and will permit no large accumulation of unsold vehicles. They will be able to tell more definitely in a few weeks what their output for the year is likely to be.

Makers See Easier Credit

WHILE there is still some hesitancy on the part of bankers in financing sales, manufacturers sense an easing up in the situation with prospects for the new year of greater cooperation by financial interests, though a conservative attitude will be maintained. Some executives see in the hesitancy displayed by

dealers in stocking their floors with cars, due to the inability to negotiate loans, a stabilizing effect upon the industry.

Many of the smaller companies particularly are able to obtain loans only upon the strength of the number of orders on hands. With the falling off in dealer demand they have been unable to present themselves to the banks and obtain sufficient funds to maintain a rigid schedule. The better feeling of the bankers will be reflected in dealer orders and this will be carried on to the manufacturers. While the dealers may experience a shortage the executives feel that the factories will be kept on a steady production schedule.

Many executives believe that there will be an immediate pick-up in sales while others hold that the upward trend will follow the usual course, improvement in the spring with buying at its peak by the middle of summer.

Southern business in sections is generally reported to be in poor condition, with no improvement expected until there is a material betterment in the crop situation. Some factories have withdrawn, from all activity in those sections.

Equipment and Parts Exhibits Hold Much of Interest in the Way of Products and Refinements in Design

FROM a display standpoint the exhibits at the New York show are of a high order and they are attracting much attention from the crowds attending the show.

Among the new products being shown by the **Stewart-Warner Corp.** is a new bumper for passenger cars. It is equipped with universal fittings to permit quick installation. It is finished in nickel and sells for $22. A pentagonal, hinged radiator cap designed to carry the Warn-O-Meter is also exhibited. This device lists at $6. A new stop signal, which operates automatically when the brake pedal is depressed, is another new article in this display. A feature of this signal is a small dashlight in series with the spotlight which shows whether the signal is operating. This outfit, complete, is priced at $5. A new Ford carbureter at $20 and an air washer are other interesting features of this exhibit.

The Budd Wheel Corp. shows a new dual disk wheel for trucks, which is said to weigh 100 lbs. Each wheel is equipped with a single disk and carries 34 x 5-in. tires, replacing a 40 x 8-in. wheel weighing approximately twice as much.

A new carbureter, designed as the Model S, is shown by the **Wheeler-Schebler Co.** It is an air-valve type and is somewhat similar to the old air-valve carbureter which preceded the plain tube type now on the market.

The Timken-Detroit Axle Co. is exhibiting a new series of passenger car axles. This series corresponds with last year's line except that a model 5000 for cars under 2800 lbs. and a model 5510 with fixed hub for heavy cars, have been added. The principal change in the 1922 axles lies in provision of an outboard bearing for the pinionshaft. A new ¾ ton bevel driven speed truck axle and a worm driven axle for the same purpose have also been added to the line.

The Utica Compressor Co. shows two new models, one designed for intermittent service and the other for continuous service. The former has an air-cooled, twin-cylinder compressor and is driven with a 1½ h.p. motor provided with an automatic controller and pressure release permitting the motor to start with a load. This model has a pressure capacity of 200 lbs. and a tank capacity of 60 gal. The price is $590. The other model is equipped with a twin-cylinder water-cooled compressor and is driven by a 2 h.p. motor. The capacity of this unit is 11 cu. ft. of air per minute. Its price is $653.

The Kerofier is a new device shown by the Double Seal Ring Co. This device separates the liquid fuel from the air after it has passed through the carbureter and deposits it against an unheated wall or inner bowl, thus allowing the air with the lighter vaporized parts of the fuel to pass on to the combustion chamber. The collected heavy ends in the bowl are drained down over a heated wall, where it is vaporized, mixes with the entering air and is carried into the cylinders. The price is $25.

A new vacuum fuel system is on exhibit in the booth of **Byrne, Kingston & Co.** It has but one valve and is mechanically operated and hydraulically controlled. There is an outer chamber enclosing an inner chamber. The operating mechanism is contained in the inner chamber or slip tank. The suction of the engine draws the fuel into the slip tank and as the level rises, the float rises and opens the valve which allows the fuel to enter the outer chamber. This operation is repeated until the level in the outer chamber reaches the valve level. A new carbureter for Fords, priced at $6, is also being exhibited by the company.

The Continental 6-T engine is on display for the first time at the show. It is a 6-cylinder model with 3⅝ in. bore and 5¼ in. stroke. It has full pressure lubrication through a drilled crankshaft. The timing gears are driven by a silent chain. It is designed for three point suspension and is arranged for the assembly of the clutch and gearset as a unit with it. The generator is driven from the pumpshaft. The engine is furnished for either battery or magneto ignition or both. The magneto drive is through the generator.

Four new axles are shown by the **Clark Equipment Co.** Two of these are of the bevel gear type and two of the internal gear design. The bevel gear types are designated as Models B and C. The former is for trucks of from 1 to 1½ ton capacity and the latter for trucks rated at ¾ to 1 ton. Both are designed for use with pneumatic tires. The road building axle is of the internal gear type and is intended for use on trucks rated at 2½ tons. A specially designed bus axle with a 71 in. tread is also shown. A 3½ ton overhead internal gear axle is another new feature.

An oil reclamation outfit designed to remove impurities from crankcase oil is being exhibited by the **General Electric Co.** It consists of two parts, a tank where the solid matter is precipitated from the oil and the heater, where the volatile impurities are driven off. The heat is supplied by electric lamps. The purified oil is collected in a container at the bottom of the reclaimer.

The new line of Model S magnetos are being displayed by the **Splitdorf Electrical Co.** These magnetos are made for 1, 2, 3, 4, 6, 8 and 12 cylinder engines. They are of the inductor type and represent a refinement over previous models.

The Storm-King electric windshield cleaner has an arm that moves back and forth across the entire width of the windshield. The arm is actuated by a chain which is in turn operated by an electric motor installed at one side of the windshield. It is manufactured by the Doughty Mfg. Co., 273 Lafayette St., New York City.

New York Show Will Be a Buying Show

EARLY indications at the New York automobile exposition were that it would be a buying show. The crowds on the opening day were fully as large as last year and they evidenced a more earnest interest in the cars. Mechanical features as well as body designs were carefully examined. Several companies reported that their retail sales on the first day were several times as large as on the opening day last year. The names of many prospects were obtained at most of the exhibits.

Orders were being placed at the show by distributors, but they were displaying an attitude of caution and apparently were determined not to stock up heavily with cars until they know what to expect

from the buying demand which is expected to follow the New York and Chicago shows.

The public is keenly interested in the new and improved models displayed at the show, but it also is keenly interested in the question of prices. Except in the highest priced class, prospective motor car purchasers are shopping carefully and they are determined to get the greatest possible value for their money.

Especial interest is being shown in enclosed models and gratification is expressed by visitors to the show over the fact that a movement is well under way to cut sharply the difference in price which heretofore has existed between open and closed models.

Show Gossip

Representatives of the Peerless Motor Car Co. at the show assert that no material changes will be made in the design of the car, for the present at least, but that it is expected sales will be largely increased by means of more intensive effort on the part of the dealer organization. No information is obtainable concerning the Collins car which it is understood will be brought out by R. H. Collins who now controls the Peerless company.

The "old guard" is returning to the organization of the Pierce-Arrow Motor Car Co. The enthusiasm which was a feature of the organization in years gone by is coming back and the outlook for the company is more cheerful than it has been in the past two years. It is understood that David Ferguson will return to the company in the near future as vice-president in charge of engineering.

The announcement by Colonel Charles Clifton, chairman of the board, that M. C. Forbes had been placed in charge of operations was misconstrued. Forbes' title remains that of vice-president and no one will be elected for the present to succeed George W. Mixter as president.

An eastern sales office for the R. & V. Knight line is being opened by J. M. Ryan, in the Gotham Bank Building, New York. With larger schedules, the company expects to go more actively after sales in the eastern territory. Ryan has been a member of the factory sales force.

Columbia Motors Co. is rapidly expanding its dealer organization and has sent out 14 more district men in the last few weeks. It is gradually eliminating distributors in the eastern territory and will have two retail establishments in New York. One of them will be on Broadway and the other in the Bronx.

Since the reorganization of the Mercer Motors Co. its sales activities have increased and the company is hopeful of doubling its production in 1922. No price changes are contemplated at this time. The dealer organization is being whipped into shape and the company proposes to have national distribution. The company has made rapid progress in the last five months in liquidating its inventory and soon will be back in the market. Export sales are being pushed as rapidly as possible.

The Velie Motors Corp. has expended $500,000 in the past year in adding to the equipment of its factory at Moline, Ill. Its engine plant at Marion is now in operation. More of this company's dealers than ever before will attend the New York show.

National Introduces Two New Bodies

THE National series is continued, but the name Sextet has been dropped. Two entirely new body models made their appearance at the show, these being the Newport seven-passenger phaeton, Model 22, and the Newport four-passenger phaeton, Model 22. The four-passenger is priced at $3500 andthe seven-passenger at $3600.

The seven-passenger is fitted with removable glass sides. The top is permanent to a certain extent, but can be lowered if desired. All the glass on each side can be entirely removed in a very few minutes, which practically turns the car into a conventional type touring model. When the glass is in place, the car is eompletely protected from rain and wind.

The glass sections above the doors open with the doors, and the interior of the body is finished much in the style of the sedan, being equipped with a heater, dome light, etc.

The four-passenger model is regularly equipped with six wire wheels and has a special khaki top. Windshield wings, spotlight, aluminum steps and double bumpers are part of the regular equipment. The chassis on both of these models is the same as the regular line.

Goodspeed Uses Piston Valve Engine

THE Goodspeed is a car designed along sport lines and is replete with refinements. It is named after its designer, who was formerly associated with the Roma Co., and who recently established several world's records for stock cars at Daytona, Fla.

The car is an excellent body job, using an all-aluminum construction with cast aluminum hood sills, fender brackets, etc. The frame supporting the body has an eight-inch depth with cross members of box construction. Long semi-eliptic springs are fitted both front and rear. A Columbia rear axle is used, while the front axle is an American ball bearing.

The engine is unusual in that it employs piston valves, producing a silent running mechanism, free from the clatter often resulting from the use of poppet valves and strong valve springs. The valves occupy about the same relative position as those in a T-head engine and are actuated by eccentrics. Large water spaces around the valves insure good cooling and the cylinder head is so designed that it makes a good foundry and production job. Lubrication is by pressure and splash, the latter being used also for the valves. There are two spark plugs per cylinder, ignition being of the dual type. The engine is of the four-cylinder type, 3⅝ x 5⅛ in. bore and stroke.

Other units comprise a Munsey clutch, Brown-Lipe gearset and fabric universal joints. Tires are 32 x 4½ in., with wire wheels as stock equipment. The radiator is protected from strains by mounting it on two ball joints instead of on the frame side members or front cross member. A feature in connection with the frame is the incorporation on the front and rear horns integral brackets for mounting bumpers. This makes a very rigid construction and eliminates the loosening of bumpers quite common with conventional installation types. The wheelbase is 124 in. Mahogany is used for trim, including the compartment back of the front seat, instrument board, body moulding, etc. Upholstery is in heavy leather. Paint and trim are optional. The price is $5400 f. o. b. Joliet, Ill.

MOTOR AGE

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The 1922 Show

WHEN the curtain raised on the New York show the public saw a much improved car. This new car is better in many particulars, some of which may be enumerated as follows:

Improved design.
More equipment.
Better appearance.
More accessible.
Better road economy.

This list might be continued more or less indefinitely, for it can be taken as a fact that the manufacturer is catering to the public for sales that will stay sold. It is the conclusion of the men in the industry, after a first examination of the cars, that the manufacturer has taken a long step forward in the factory.

The men of the industry who are attending the show are not so sure that the same long step has been taken in the sales office. There are several things that the dealer wants to know more about and he is at the show in considerable numbers to learn about these things. Among the questions he has on his mind are these:

Is the manufacturer going to stop the adjustment of prices and fix on a stable value for his products?

Is the manufacturer going to keep in mind the great stock of used cars that stands between the new cars and the public?

Is the manufacturer going to settle on his sales policy and program and stay settled so that the dealer shall know to whom he shall report?

These questions are being asked right and left at the show and there is none to answer. Probably the answer will come from somewhere before the show closes and the dealers and manufacturers will go home of one mind and the policy for the sales will be settled for a season at least, for all appear to realize that some sort of a settled policy is necessary if buying is to begin with the spring months.

But the opening of the New York show is, in the main, very pleasing to those most concerned and the predictions are for a very successful show season and that the shows are quite necessary this year to bring the men of the industry together that they may talk over their troubles, past and future, and arrive at a general conclusion from this melting pot.

The first act of the show season has gone over nicely and the audience appears to be very well pleased. The producers and the actors are not yet cocksure that they have the thing the public is going to support with money after the show closes, but they are hopeful. All hands admit that with the improved article of merchandise in their hands, it is up to those within the industry to convince the public.

How well this is done will be told in the story next December.

Mailing Lists

SOME weeks ago there was printed in MOTOR AGE an editorial which referred to faulty and out-of-date mailing lists. This editorial has attracted quite a bit of attention, and we have been informed that some dealers examined their lists and effected some material savings by eliminating the dead names on their lists.

In the last few days we have had our attention called to this waste again by the number of mail communications reaching MOTOR AGE addressed to 910 South Michigan avenue. It is almost five years since MOTOR AGE offices were at that address, and yet a list containing this address has apparently been sold recently to numerous manufacturers and others as a living mailing list.

We wonder how many users of lists watch the returns and make changes accordingly. If they do not, the waste must be appalling, to say nothing of the cluttering up of the mails with communications that cannot be delivered. Help yourself and at the same time help the postman by watching your lists.

Improvement in Accessibility

ONE of the gratifying things to those who go through the new models at the shows this year with an eye for serviceability is the thought being given by manufacturers to accessibility on the various units. There is a tendency on the part of most makers now to call to the attention of the factory service manager the car's design before it is put into production. The thought here is that the service manager is in a more strategic position to judge the serviceability and maintenance cost on a car than any other person at the factory, providing, of course, that such a service manager is in intimate contact with the dealers' service stations in the field.

On the new models the conventional underpan has virtually been eliminated and in its place we find sheet

steel filler pieces fastened through the engine and side members of the frame with accessible bolts. This makes the crankcase more easily reached and also keeps the engine and accessories clean. Oil fillers and breathers are better located and in several instances the job of draining the crankcase has been made much simpler.

Frames have been stiffened considerably and to the service man this means much because it eliminates frame weaving and resultant action upon the body which often results in undesirable squeaks and changes in the body structure.

In place of the usual nut and cotter pin construction one maker is using a double lock nut layout on his car which obviously makes it much easier, from a service standpoint, to remove and replace such nuts. This is especially desirable on such parts where the nut or bolt is subjected to water and mud.

A Flat Rate Thought

THERE is, in a northwestern city, a service department that has paid a profit of 10 per cent for several consecutive months. This department does the service and overhauling work of the distributor of a high-priced car and is conducted on a flat rate system. The service chief has worked out schedules for 250 operations without help from his factory. Indeed, it is the understanding that this factory is not entirely sold on the flat rate system. The rates now worked to in this department have been made up from time slips and observation in this department alone.

In speaking of this work, the general manager of this company said that apart from the business advantage of selling service in this way that there had come as a by-product a rivalry among the mechanics that built an exceptional efficiency and morale. The work is closely inspected and "call-backs" carry a penalty.

The men pride themselves on the few number of "call-backs" and they adopt each other's suggestions for a self-inspection of their work. They are very anxious to get what the printer calls a "clean proof." Another feature is the effort of the mechanics to "show up" each other by shortening the time of a particular job. Frequently this is accomplished by the use of different tools, or machines, and the discovery of a "short cut" is a daily happening in this shop.

In speaking of the flat rate system. the general manager of this large distributing plant, and he is not a practical service man but a product of big business, said:

"Having a service salesman price repairs on a flat rate system had reduced our complaints to almost nothing. Disputed bills are a rare occurrence in our office. We see in the flat rate the only method of merchandising service."

Killing the Goose

THE tax makers of this country often defeat their own ends by killing the source of taxes through inflicting such heavy charges that the public refuses to pay. This was the experience with the raise in railroad rates and with numerous other war finance outcroppings. Now comes the report from Connecticut that motor vehicle owners there are refusing to pay the extraordinary taxes inflicted in that state, to which has been added a tax on gasoline. As this tax effort was chiefly one for revenue gathering, the tax defeated its own end by a prospect that it will bring a smaller revenue despite the higher rate.

The tax situation as regards the automotive vehicle is a curious one and it is more than passing strange that the astute financiers who collect money for the several states cannot decide among themselves as to what is the best and most reasonable method of imposing these taxes.

It appears rather silly that men who have been selected to govern a state should impose heavier taxes upon the highly essential motor truck than on the passenger car which, despite its proven essentiality and business efficiency, is frequently used for recreational purposes, and is still, by some persons, regarded as a luxury. But the fact remains that the truck, in most states, is grossly overtaxed, and in some cases there is every evidence of an effort to drive the truck off the highways by excessive taxes. Just how much of this is due to railroad influence is hard to say, but there must be a motive which has not yet been made clear.

The talk of highway protection is chiefly camouflage, because many states that so heavily tax motor trucks have no highways to protect. To show how far apart the states have wandered, it might be stated that it costs $392.50 more to register a typical five-ton truck in West Virginia than in Louisiana.

The passenger car situation is not as bad as that of the trucks, but it is bad enough to call for an instant effort to remedy it. While it is certainly true that the truck is overtaxed, it does not appear that the passenger car is sufficiently taxed, taking the average of all states.

There is a wear and tear on the roads that should be paid by vehicle owners, and this has been made the basis of what would be considered a reasonable automotive vehicle tax. But in the case of the passenger car, both the method of taxation and the amount levied are so far apart in the various states as to make what should be an economic problem into a comedy. Here, for instance, are the extreme taxes on passenger cars by price classes:

Price Class	High	Low
$ 400	$22	$5
1,000	28	5
1,600	40	5
2,000	47	5
4,000	72	5

The methods of assessing taxes are equally interesting. This is how the various states do it:

Basis	No. of States
Horsepower	25
Weight	11
Horsepower and weight combined	4
Percentage of original cost	2
Flat rate	2
Weight and percentage of cost	2
Horsepower, length of service and number of cylinders	1
Per cu. in. piston displacement	1
Weight, horsepower, percentage of cost and length of service	1

The remedy, of course, is more uniformity in methods. This has long been the suggestion of the automotive industry, in which it is joined by the leaders of owner organizations and of highway work. Several organizations have joined in forming the Motor Conference Committee. and this committee has drafted a Proposed Uniform Motor Vehicle Law. This law has been considered by several state assemblies and is making for uniformity in motor vehicle laws. There is, however, need for earnest work if the present tangle is to be smoothed out, and the Motor Vehicle Conference Committee will need the help of every well wisher in the automotive industry in the promotion of this legislation.

Direct Service Plan Inaugurated

Parts Makers Announce Plan for Nation-Wide Service

Hundreds of Depots Will Furnish Genuine Units on Very Short Notice

NEW YORK, Jan. 9—The opening of the New York show has brought forth the official inauguration of the direct service plan by leading units parts manufacturers. Under the plan 40 central parts stations and upwards of 300 branch stations will begin immediately the furnishing of parts for units direct to owners possessing cars in which these units are standard equipment.

Included in the plant at the outset are Continental Motors Corp., Timken-Detroit Axle Co., Brown-Lipe Gear Co., Borg & Beck Co. and Spicer Mfg. Co. Each of these represent a separate unit entering into the manufacture of a car. Other manufacturers will be embraced in the plan until it includes at least the manufacturer of each important unit.

Several of the most important results which the unit manufacturers claim for this plan are as follows:

"Doing Away With Pirate Parts—It will make it unnecessary for the dealer to nullify the guarantee on his vehicle by selling his customers inferior parts made by other than the manufacturers of the original unit. This action on the dealer's part has been necessary in the past, as he was not able to obtain genuine parts immediately. The stations carry only genuine parts designed, produced and inspected by the specialists of the unit manufacturers' organization.

"Lowering of Parts Prices—Direct assistance to manufacturers, dealers, small and large fleet owners, and users.

"Protection for car and truck manufacturers' service when territories are without representation.

"Elimination of investment by dealer, allowing him to use his working capital in the promotion of sales.

"Guarantees genuine parts so that the dealer and owner of specialized vehicles can depend upon purchasing genuine material. All parts are to be trademarked by the unit manufacturer producing them. This will provide a universal means of identification and a guarantee of protection and value.

"As one member of the unit manufacturers' committee has put it—'The extent to which the plan succeeds will be directly proportioned to the extent to which it serves the automotive industry in general. It is a great step forward. Its basic ideal of unselfishness is alone sufficiently meritorious to warrant enthusiastic support. The plan is unique in that it is the first undertaking of its kind in the automotive industry.'

"The policies under which the stations will operate are in the hands of a committee made up of one representative from each of the companies that are working under this plan.

"The station managers are to represent the customers of the unit manufacturers in their respective territories, in promoting the sale of specialized vehicles. Through the stations will be held sales conferences eligible to all dealers and salesmen selling vehicles equipped

(Continued on page 35)

Bill of Lading in New Form at N.A.C.C. Recommendation

New York, Jan. 11—A new form of domestic bill of lading prescribed by the Interstate Commerce Commission omits the paragraph in the present bill of lading which tends to release carriers from liability for loss or damage to shipments on open cars. This is a point for which the National Automobile Chamber of Commerce contended in the bill of lading proceedings by giving testimony of the extent of open car shipments of motor vehicles and the inability of carriers to furnish automobile cars.

The traffic committee of the N. A. C. C. has filed with the Interstate Commerce Commission a request to be heard on the subject of freight rate revision.

PAIGE STRONG FOR SERVICE

Detroit, Jan. 6—Under the terms of the new Paige contract, distributors are required to add a special service man whenever the factory may consider it necessary to relieve some particular trouble, which dealer service men are unable to meet successfully. Such a man would work with the factory service man in the territory instructing the general service men in the way to meet the difficulty.

Dealers are urged in letters accompanying the contracts to do everything in their power to make pleased owners, even to the extent of offering special services such as monthly inspections, grease and oil service for stated periods, but these are left to the discretion of the dealer and the experience of the owner.

SEEK DRY CELL STANDARD

Washington, Jan. 9—Bureau of Standard officials are endeavoring to bring about the standardization of dry cells. Conferences have been held with the manufacturers of batteries and with representatives from the automotive industry, in an effort to determine upon specifications. At this conferences 17 sizes of the larger dry cells were considered, seven of which were recommended as standard. It is expected that an agreement as to acceptable standards will be reached within a few days.

Capacity Force Marks Ford Plant Opening at Detroit

Company Looks for 1921 Volume; Is Prepared to Keep Factory Busy on Parts

DETROIT, Jan. 9—Ford Motor Co. resumed operations today on a basis approximating full capacity of the Highland Park plant, 40,000 men being employed, working in sifts under which 32,000 are employed at one time. This compares closely to the number employed by the company through 1921.

Though a statement has been issued by Edsel Ford, president of the company, that the company looks for a volume of business aggregating that of 1921, it is considered likely that the company is prepared to keep its factory busy in the manufacture of parts for cars already in the hands of owners, as manifested by its recent change in parts sales policy, if sales of which fall off.

Officials have declared that if the company were to get but a small fraction of the parts replacement business now going to independent manufacturers, it would mean a very large addition to the output of the plant. Fortified with a heavy demand for parts, the company would not have to depend so largely upon the sale of new cars to keep the plant in 100 per cent operation.

LAKE SHIPMENTS INCREASE

Buffalo, Jan. 11—Increasing use of the Great Lakes for the movement of new automobiles is shown in the annual report of the port of Buffalo. This form of transportation was almost unknown in 1919. In 1920 there were 3853 automobiles brought to Buffalo by boat, and in 1921 the number was increased to 4772. A further increase is anticipated next season.

CHANGES IN OWEN TIRE CO.

Cleveland, Jan. 11—W. M. Scott, receiver for the Owen Tire & Rubber Co., organized in 1917 and owner of a large plant for the making of tires and tubes at Bedford, a suburb of this city, has made startling charges of fraudulent actions and misconduct against former officers of the corporation, in a series of suits filed in common pleas court here.

BOND ISSUE IN NEW JERSEY

Trenton, N. J., Jan. 11—Republican members of the New Jersey legislature have decided to recommend the passage of the bill which would place before the people of the state next fall a referendum on a bond issue for $50,000,000 for an improved system of state highways.

Detroit Plants Tuning Up to Meet Spring Schedules

Production in December Dropped to Very Low Figures; New Models Feature

DETROIT, Jan. 11—Production in December, except for a few factories, was practically at a standstill. Though a number of factories kept on a sales basis in the early part of the month, this activity gradually dwindled as the holidays approached, so that from the 20th on there was almost a complete cessation of production in all plants.

Ford Motor Co., prior to closing for inventory on the 21st, had been running along replenishing parts stocks, with minor activity in assembling. Sales for the month will approximate 50,000 cars. Figures on complete production or sales for 1921 are incomplete, but sales will run about 100,000 in excess of 1920. Production in all plants will near 1,000,000.

Maxwell has continued along steadily in the manufacture of its new model, turning out about from 100 to 150 daily throughout the month except for a few days of inventory period. Preparations were made to get into production early in January on the new **Chalmers,** models of which will be shown for the first time at New York.

Dodge Brothers, while assembling and shipping 100 to 150 cars a day, was making parts for about 450 vehicles daily, in anticipation of a strong early spring. Dealer stocks are low, shipments having been held by the company to a sales basis. The fact that stocking has not been done has been responsible in large part for the report that an early cut of Dodge prices may be expected.

Buick, working on about half-time basis throughout the month, has been the most active of General Motors units, **Cadillac** production and shipments falling off early in the month. **Chevrolet** has maintained an active front, and **Oakland** and **Oldsmobile** have been moving along slowly.

Studebaker, after closing for inventory early in the month, has been gradually working back to a production point which is expected to reach, early in 1922, the same record-breaking proportions as experienced by this company in 1921. The refinements in models brought out by the company in all its lines are expected to add new popularity to that already registered.

Hudson-Essex have been working along on about half-time basis for the month, and with new prices on all lines now effective, is tuning up for heavy production following the shows.

Reo has been operating on a sales basis throughout the latter part of the year, December operations being on about 50 per cent basis. **Speed-wagon** business has shown consistent gains, and with the addition of the special taxicab model to its line, the company looks for another stable business producer.

Earl Motors, Inc., under the impetus of its new models and widely strengthened dealer organization, maintained a steady production schedule throughout the month and will increase this during January. **Hupp, Paige, Liberty, Dort, Columbia** and **Saxon** have been operating on part-time on sales basis only, but steadily strengthening their dealer organizations in anticipation of early 1922 business.

Packard reported both car and truck business in December as in excess of November, and considerably in excess of business in December, 1920. **Wills Ste. Claire, Handley-Knight, Roamer,** in the higher priced car class, have moved along slowly during the month, but report a share in the general business consistent with the time of year.

Service to Enter New Field With 55-Passenger Vehicle

Wabash, Ind. Jan. 11—A railroad car division of the Service Motor Truck Co. with a complete staff of its own, has just been announced by the Service Motor Truck Co. which organized the new division following a demand created by demonstrations to railroad companies of the 30-passenger railroad coach mounted on Service truck chassis. Charles Guernsey, for several years chief engineer of the company, has been made manager of the railroad car division; William Petty has been named engineer in Guernsey's place, while William E. Marvel will be manager of sales of the railroad division.

Fifty railroad officals from over the country are expected here late in January to witness a test and demonstration of a new 55-passenger railway coach mounted on a Service truck. The new design is now under way and will be completed in time. The first demonstration of the 30-passenger coach, which was held some time ago, was made over the Big Four Railroad on a trip to Benton Harbor, Michigan.

RESTRICTS BUS LINES

San Francisco, Cal., Jan. 11—Evidences of a new policy which will tend toward the curtailment of further increases of automobile stage and motor bus lines and business in California are contained in several decisions recently handed down by the California State Railroad Commission, which has control of all forms of transportation in this state. These decisions also indicate that more drastic regulation and closer restriction of operations is about to be imposed on the motor service men of California.

EDITORS AT SHOW

Chicago, Jan. 11—Clyde Jennings, managing editor of MOTOR AGE, and B. M., Ikert, technical editor, attended the automobile show in New York.

Georgia Dealer Convention Expresses Trade Confidence

State Association Discusses Discounts and Prepares for Business

ATLANTA, Jan. 7—That the automotive dealers of Georgia are supremely confident there will be a revival of buying the early part of 1922 was indicated at the third annual convention of the Georgia Automotive Dealers' Assn., held at the Ansley Hotel here, Jan. 3, when more than $1000 was subscribed in a few moments' time to take care of the association's activities the next week weeks.

The convention was attended by about 75 of the state's leading dealers, the majority of whom represented the industry in the larger cities such as Atlanta, Savannah, Macon, Augusta, Columbus, etc., and while all were free to confess that 1921 proved a very poor year for the industry as a whole in this state, the consensus of dealers was that all indications point toward a revival of buying on the part of the public by next spring at the very latest. Among the dealers in the smaller towns and rural communities, however, optimism is not so prevalent, as conditions in the smaller centers do not promise any material increase in sales before the next crop is gathered.

George W. Hanson, president of the Hanson Motor Co., was the principal speaker, discussing conditions of the past year and the future outlook. He expressed the opinion that 1922 as a whole is destined to prove a fairly prosperous year for the industry.

He advocated the elimination of the present method of the manufacturers, and stated that the industry would profit materially if a flat price were quoted to the dealers and a flat price to the buyer, the difference to represent the dealer's profit.

Considerable discussion was devoted to a contract letter advocating a higher discount for dealers, and it was decided to send this letter to the National Automobile Dealers'Assn. as expressing the views of the Georgia body in regard to this matter.

Report of the legisltaive committee indicated that this committee saved dealers of the state many thousands of dollars by its activity during the last session of the state legislature.

The motion picture on sales made under the direction of Ray Sherman, merchandising director of the A. E. A., was shown before the Georgia dealers, and proved one of the most valuable features of the convention.

Officers for the ensuing year were elected as follows: Volney Williams, Savannah, president; D. M. Lyons, Augusta, A. S. Hatcher, Macon, C. C. Baggs and E. H. Baughman, Atlanta, vice-presidents; Percy A. McGahee, secretary, and

A. F. Hill, Jr., Atlanta, treasurer. Directors, Thad Huckabee, Albany; A. H. Reed, Columbus; R. C. Dunlap, Macon; C. A. Trussell, Athens; G. W. Gilmore, Sandersville; Ed. Dugan, Hawkinsville; E. B. Sinkler, Savannah, and J. N. Stinson, Waycross.

RAILWAY FIGHTS FAY BUSES

Rockford, Ill., Jan. 7—The Rockford City Traction Co., with a circuit court judgment of $3749, secured on damage action, and supported by two minor creditors, is attempting to force the Fay Bus Co. into bankruptcy. Petition filed in the Freeport Federal court charging insolvency fixes assets at $18,000 and liabilities at $30,000.

Last spring the bus company sought a capital stock increase and T. J. Fay received valuation of $109,000 on the company properties after the commerce commission reviewed the petition.

Installation of "feeder" buses for the traction line is contemplated Jan. 15, and the bankruptcy action is believed to be predicated upon effort to close out the Fay bus lines.

ASKS INSURANCE RECEIVER

Lansing, Mich., Jan. 11—Insurance Commissioner Hands of Michigan has asked for the appointment of a receiver for the United States Mutual Automobile of Saginaw on the ground of insolvency. The Mutual has liabilities of $105,000, largely in unpaid loss claims. A 50 per cent assessment was levied in October, but a large part of the membership refused to pay and the unpaid losses kept mounting.

It is also charged that the company wrote business at cut rates and paid extravagant salaries to its officers. These were also officers of the Peninsular Fire of Grand Rapids, which is having trouble with the Michigan department.

PAN-AMERICAN TO DISSOLVE

Decatur, Ill., Jan. 7—Dissolution of the Pan-American Motors Co. has been approved by resolution adopted by directors and stockholders have been called to meet in this city Jan. 17 to vote upon the proposal. The corporation is solvent, the directors assert, but point out that in common with small concerns, Pan-American has suffered during the recent months. Dissolution is urged to make possible early reorganization, a new start or at least conclude life of the organization while its accounts are still in good business form.

BURLINGTON SHOW ON

Burlington, Iowa, Jan. 7—Spaces for 45 exhibitors have been taken at the Des Moines County Motor Trades Bureau display which opened Jan. 9 and continues through the week. Accessories will be important features of the show and by curtailing original spaces, provision was made to accommodate applicants for the display. At the banquet, which concludes the show, Ray W. Sherman will be speaker.

Cleveland's Row Clears Used Cars in Intensive Campaign

Cleveland, Jan. 11—The average dealer in automobiles in this city will carry but a small stock of used cars into the new year. This is the result of an intensive campaign that has been carried on for the past six weeks for the purpose of reducing inventories of used cars.

Cleveland never saw such an aggressive sales campaign as that which has been waged for the disposal of used cars. The newspapers for six weeks have been carrying more advertisements for the used car departments than they have for the space that is devoted to the sale of new cars.

The dealer here has operated on the theory that if he is to sell new cars on a large scale in 1922, he must be able to take used cars in trade.

HART-PARR RESUMES WORK

Charles City, Iowa, Jan. 7—The Hart-Parr Co. resumed work at the beginning of the year to a limited extent, after having been partially closed down for a while last year. Twenty-five expert erectors were called back this week, and the management is of the opinion that this force will be gradually increased until several hundred are again at work here. An order for tractors has recently been received from France and work will be started on this order at once.

WINDSOR SHOW IN FEBRUARY

Windsor, Ont., Jan. 6—The Windsor Automobile Show will be held Feb. 27 to March 4, 1922, at the armories, under the auspices of the Border Cities Automotive Dealers' Assn. The officers of the association were elected for another year at a meeting recently. F. L. Copeland is president; Fred Duek, secretary; A. E. Thompson, treasurer.

BUFFALO SPACE ALL TAKEN

Buffalo, Jan. 10—All available space in the 74th Regiment Armory will be filled when the 20th annual show of the Automobile Dealers' Assn. of Buffalo opens Jan. 14, to continue for one week.

Where Some Automoblie Bumpers Come to Grief

UNDER the management of Maj. R. W. Schroeder, one-time holder of the altitude record, Chicago has the most expert safe-crackers in the world. They also silence burglar alarms, pick automobile locks, wreck automobile bumpers and perform other criminal accomplishments with the greatest speed and finesse known. These men make up the casualty department of the Underwriters' Laboratories and are employed to beat the burglar, the safeblower and the yegg by testing safety devices and all inventions for the safeguarding of human lives and property. The Underwriters fix the rate of insurance by the results of the tests of the various devices submitted.

If they can beat them they know the devices are not able to withstand the attacks of burglars and workers in the field of crime. The picture shows the result of a test of an automobile bumper. The bumper is bolted to an automobile frame and a 650-lb. weight suspended from a cable is swung against it from a distance of 30 ft. The impact is equivalent to one that would result from a car running at a speed of 40 m.p.h. and striking a tree or other fixed object.

Tire Industry Faces 1922 in Strengthened Position

Production Believed to Be Normal; Akron Plants Turn Out 100,000 Daily

AKRON, O., Jan. 10—After "scraping the bottom" during the most hectic and uncertain 12-month period in its history, the rubber tire industry has emerged from the year's slump and re-established itself upon a reasonably firm footing, in the opinion of rubber manufacturers, and has started the new year with production on a basis which, if remaining constant throughout the year, will mean the manufacture of close to 40,000,000 of automobile and truck tires in 1922.

Tire production in Akron alone, according to an authentic check, now is averaging more than 100,000 tire units a day. This is the highest production point point reached by the tire industry in 18 months, and compares favorably with the peak production obtained during the industry's short-lived era of unprecedented prosperity in the early months of 1920. It is practically impossible to gage normal tire production in Akron for the sake of comparative figures, in view of the sudden leap of the industry from its prewar status, to its inflated condition in 1920, but if normal can be considered 75 per cent of the peak of 1920, then Akron's tire factories are back to normal and in most instances above normal, with some even approaching the old peak, which it had been predicted never again would be reached.

The advent of the new year has brought with it a rush of spring orders from tire dealers and automobile manufacturers which, it is figured, will keep Akron's tire plants running at full blast for at least five months.

Rubber factories are employing over 45,000 wage earners, as compared to 80,000 in peak times and 18,500 during the lowest ebb of the industry here in December, 1920.

Official figures of the Rubber Association of America reveal the fact that tire production in the United States during 1921 ran about 19,000,000 tires. And an official check in Akron shows that Akron factories alone turned out between 15,000,000 and 16,000,000 of this total. Akron tire manufacturers report sales for 1921 aggregating more than $300,000,000.

In addition to the manufacture of more than 15,000,000 tires here in 1921, the huge surplus of tires which existed a year ago has been completely absorbed.

Perhaps the most important prospect for 1922 is a climb upward again of tire prices.

Akron manufacturers do not hesitate to admit that if they are to make money in 1922 they will have to increase tire prices again, unless of course there should be a sharp recession in the price of rubber and cotton. The important factors in the definitely contemplated upward revision of price schedules are the steady increases in the cost of crude rubber and high-grade cotton. Rubber has gone up 50 per cent since last June, and cotton has gone up 60 per cent.

Reign of Pessimist Is Over

SYRACUSE, N. Y., Jan. 7—Commenting on the outlook for 1922, H. H. Franklin, president of the Franklin, Automobile Co., says:

The business outlook for the coming year is encouraging.

One feels like getting into the fight.

All business signs point ahead.

Each month should see a gain in general conditions. The entire world will move forward slowly.

The revel of the pessimist is about over.

High Freight Rates Cause Carload Shipment Slump

Washington, Jan. 11—Comparison of freight commodity statistics of railroads having an annual operating revenue above a million dollars show a decline of 6773 carloads and 13,814 net tons of automobiles and trucks classified as revenue freight, originating on respondent's road during the third quarter of 1921, ended Sept. 30, as against a similar period of last year

These figures do not clearly reflect the effect of freight rate increases which became effective Aug. 26, 1920, inasmuch as the figures for the third quarter of 1920 included only one month of high freight rates. It indicates, however, a tendency to ship motor vehicles on their own power because of the excessive freight charges.

The statistics for the third quarter of 1921 show that 108,942 carloads and 879,771 net tons of automobiles and trucks were carried as revenue freight, originating on various roads.

FRANKLIN 1921 SHIPMENTS

Syracuse, N. Y., Jan. 7—Officials of the Franklin Automobile Co. report that 8545 cars were shipped during 1921. This represents eighty-one per cent of the number of car shipped during 1920, Franklin's peak year—and the year when demand for automobiles generally reached heights hitherto unprecedented. Fifty-two per cent of Franklin shipments for 1921 were enclosed cars—an increase of seven per cent over 1920.

SEEKS $75,000 DAMAGES

Aberdeen, Wash., Jan. 6—That the Ford Motor Company, by failure to keep a contract and by a "policy of coercion," has damaged the business of the Grays Harber Motor Co. to the extent of $75,000 is charged by the motors company, which has filed suit for the recovery of this amount against the Ford organization.

California Truck Operators Take Up Gage of Railways

Tax of $285 Per Truck Per Year Imposed in Some Cases; Railroads Cry No Tax

SAN FRANCISCO, Jan. 7—Motor truck owners and operators of truck fleets in California at last have made reply to the attacks of the railroads, which, not only in California, but in all the states of the Pacific slope, have been endeavoring for some months to put the motor truck fleets out of business, either by the imposition of unusually heavy taxes, under the guise of payment for construction and upkeep of highways, or by obtaining such restrictions for motor truck and motor bus lines that they cannot compete with the rail lines, even on short hauls.

C. M. McLenegan, manager of the Pioneer-Gibson Express in northern California, has made public a letter in reply to the attacks of the railroads, which reads in part as follows:

"The first thing that is brought up by the opponents of motor transportation is the allegation that companies engaged in this class of business do not pay any taxes for the use of the highways. This is a fallacy, as the following figures will show. The company which the writer represents operates over the highway from San Francisco to San Jose, and in so operating comes under the jurisdiction of three counties and 12 incorporated towns and cities. Each one of these political subdivisions has the power to tax or license the operator of a passenger or freight-carrying line, and all of them do so. Following is a list compiled from the laws and ordinances of these various communities, showing what charges are assessed against motor trucks only:

Subdivision.	Per Truck Per Year.
City and county of San Francisco	$7.50 to $12.50
City of South San Francisco	20.00
City of Burlingame	16.00
City of San Mateo	16.00
Redwood City	20.00
Town of Mayfield	10.00
Town of Mountain View	32.00
Town of Sunnyvale	32.00
Town of Santa Clara	12.00
City of San Jose	7.50
County of Santa Clara	10.00

"From the above it is easy to see that licenses alone—as the above are licenses only, and not taxes—make it necessary for the truck owner to pay $185 a year for every truck he operates over the roads through these communities, merely an average route in northern California. To this must be added state motor vehicle license averaging about $30 per year per truck, and a personal property tax on assessed valuation of from $500 to $2000 on various truck units, according to age and size, and we see the figures mounting to far greater heights than the casual observer of truck fleets in operation believes. In this company's

case, also, each 'road truck' making a daily call in these communities is liable to a tax amounting to about $285 per year, which, based upon an assessed valuation of $2000, would mean 14½ per cent per year."

BATTERY STATION RATES

Bridgeport, Conn., Jan. 6—Contending that present rates do not yield an adequate remuneration for the labor involved and are not on a par with charges of garages, local battery-service interests are agitating an organization, with concerted action to bring about revision of price schedules.

Present plans are not materially to revise present rates for recharging batteries, but to make an adequate charge for removing them from and replacing them in the cars. This is now ordinarily done free. A nominal rate is included on the price card, where removal of the battery or replacing it call for extra work or attention. Ordinarily the only charge is the fixed one for recharging.

ATLANTA PLANS BIGGEST SHOW

Atlanta, Ga., Jan. 11—With at least 50 different makes of motor cars on exhibition at the second annual Great Southern Automobile Show, to be held here Feb. 11 to 18, it is now certain that the Atlanta Automobile Dealers' Assn. will realize its dream of staging the biggest automobile show in 1922 that has ever been held anywhere in the South. At least five new makes of motor cars will be exhibited.

This year's show will be primarily of an educational nature, as demonstration features will be incorporated in most of the displays of both cars and equipment. There will also be a larger number of truck and tractor displays than last year.

NEW LAWS IN GEORGIA

Atlanta, Jan. 7—New tax laws which went into effect in Georgia this year, of interest to the automotive industry, are as follows: Used car dealers, an increase of from $25 to $100 per year; automobile assembling plants, a decrease of from $100 to $50 per year; motor truck assembling plants, an increase of from $25 to $275 per year; automobile garages, an increase of from $25 to $50 per year; automobile dealers, tax remains the same, $275 per year; automobile schools, tax remains the same, $10 per year.

CORRECTIONS

MOTOR AGE said in a recent issue that the Lexington Motor Co. would exhibit a light six at the New York show to sell in the neighborhood of $1300. This statement was a mistake. The Lexington company will not produce such a car.

The correct price of the Earl roadster is $1485.

Price Changes Continue as Feature in Automobile Field

Marmon, LaFayette, With Many Others Lower Selling Price to Growing Competition

MARMON LOWERS PRICES

Indianapolis, Jan. 7—Another revision of prices is announced by the Nordyke & Marmon Co. on the entire line of Marmon cars. The prices, which are effective Jan. 3, are:

	Old Price	New Price
4-pass. roadster	$3985	$3700
4-pass. touring car	3985	3700
7-pass. touring car	3985	3700
7-pass. sedan	5425	5150
4-pass. coupe	4875	4700
Speedster	4185	3900
Suburban	5425	5300

The new reductions represent total cuts ranging from $1300 to $1500 within a year.

LAFAYETTE LOWERS PRICES

Indianapolis, Jan. 11—Lafayette Motors Co. has made sweeping reductions in the prices of its various models ranging from $760 to $1350. The prices are as follow:

	Old Price	New Price
Roadster	$4850	$3985
Touring	4850	4090
Torpedo	4850	4090
Coupe	6250	5000
Sedan	6500	5175
Limousine	6750	5400

INCREASE DAVIS PRICES

Richmond, Ind., Jan. 7—The George W. Davis Motor Car Co. has increased the price of its touring car from $1695 to $1795.

R. & V. KNIGHT PRICES LOWER

East Moline, Ill., Jan. 7—R. & V. Knight Motors Co. has announced price reductions of approximately 20 per cent, effective immediately. All six-cylinder models, including the seven-passenger car, four-passenger sport, two-passenger roadster, are reduced from $3350 to $2750; the four-passenger coupe from $4000 to $3350, and the seven-passenger sedan from $4200 to $3450.

New prices for the four-cylinder models are:

5-passenger touring from $2150 to $1850.
5-passenger sedan from $2950 to $2750.
4-passenger coupe from $2850 to $2650.

J. M. Ryan, nine years member of the sales department, has gone to the New York show, and immediately afterward will open headquarters as eastern sales representative.

SAXON DROPS PRICES

Detroit, Jan. 7—The Saxon Motor Car Co. announces that it has reduced prices on its open and closed models. They are:

	Old Price	New Price
Runabout	$1295	$1195
Touring car	1295	1195
Coupe	1995	1795
Sedan	1995	1795

AUBURN PRICES LOWER

Auburn, Ind., Jan. 6—The Auburn Automobile Co. has made a reduction in the price of its car affecting all models and operative at once. The new prices are as follows:

	Old	New
5-passenger touring	$1695	$1575
Roadster	1670	1575
7-passenger touring	1760	1615
Coupe	2475	2275
Sedan	2495	2395

The four passenger sport model is priced at $2195.

STEPHENS AGAIN REDUCES

Freeport, Ill., Jan. 6—Price reductions on all its models are announced by the Stephens Motor Works of the Moline Plow Co. The prices are:

	Old Price	New Price
Roadster	$1800	$1675
4 and 6-pass. touring	1850	1745
4 and 7-pass. sedan	2850	2650
4 and 6-pass. sport	1950	1795

TRACTOR PROSPECTS FAIR

Atlanta, Jan. 7—The tractor outlook over the Southeast is fairly good, especially for industrial sales and in the timber tracts, where operations are being resumed on a broad scale.

Vesper Dinner Group, St. Louis

Parts Makers Announce Plan for Nation-Wide Service

Hundreds of Depots Will Furnish Genuine Units on Very Short Notice

(Continued from page 30)

with units represented by the stations. There will also be conferences held in each station territory for instruction to the dealers' mechanics.

"Careful inspection of each major station and each sub-station will be made regularly by a factory representative, so that high ideals and standards set for the stations will be maintained.

"Continuous national, trade-paper, newspaper and direct advertising will be run by both unit manufacturers and stations directly promoting the sale of the specialized vehicle."

As one member of the parts makers' committee expressed it, "service is the cornerstone of the automotive industry and adequate parts service is the motor which holds this stone in place. A passenger car or motor truck without national parts service is like a battleship without guns, a fine target for a competitor but with nothing to fight back.

"One of the greatest drawbacks to the automotive industry in the past has been the inability of the car and truck owner to enjoy uninterrupted service because the dealer was unable to obtain genuine parts immediately. Two of the most important reasons for this is the financial situation of the average dealer and the ever-increasing rate of dealer mortality.

"This plan, then, of the leading unit manufacturers is built from the ground up. Acknowledging the importance of service they have started at the beginning by putting parts distribution on a firm permanent foundation, where it will bring the greatest good to the greatest number.

"The parts service end of the plan assures the owner and buyer that they can keep their vehicle in uninterrupted service anywhere in all parts of the world where automotive equipment is used.

"Car and truck manufacturers all see the importance of building for the future. To do this every selling force must be brought to bear to produce repeat orders. The greatest selling force is satisfaction through past performance. The greatest satisfaction is through adequate efficient service. Real service is possible only with genuine parts instantly available. Parts service then is a great selling force and one which it has not been possible to utilize in the past.

"So reason the leading unit manufacturers responsible for this plan and around this ideal they have built a far reaching organization.

"This plan divides the United States into 40 territories. The size of each territory has been proportioned in accordance with the population, vehicle registration, buying power and the vehicle sales' possibilities for the future. Each of these 40 territories is to be serviced by what has been called a major parts depot. This is to serve as a central distributing point for the territory.

"Of the 40 stations planned, 35 are now in operation with the remaining five in process of development.

"In each territory and under the jurisdiction of the major station are a series of sub-stations. These sub-stations distribute in a specified local territory. There will be from six to 10 sub-stations under each major station. The location of each sub-station is such that immediate parts delivery will be possible in all important localities and a maximum of five-hour service possible in the less populated districts.

"It is estimated that there will be at least 325 sub-stations distributing genuine parts in their respective territories.

"A chain of stations suitably located will take care of this important market. Statistics accumulated by the unit manufacturer indicate that no other single cause has done more to limit the sale of specialized cars and trucks in Canada than lack of protection as a result of practically no parts service.

"The first stations to be established in Canada, will be at Vancouver, Winnipeg, Toronto, and Montreal, with sub-stations under each major station.

"Plans are already under way for the establishing of stations throughout the British Isles, Australia, Hawaii, Cuba, Mexico, Netherlands, Norway, Sweden, India, Japan, and in fact, every country where specialized vehicles are used.

"This world-wide organization is to be devoted to one fundamental task—to promote the sale of specialized cars and trucks. The policies under which these stations will operate are in the hands of a committee made up of representatives of the leading unit manufacturers."

CALIFORNIA SALES FIGURES

Los Angeles, Jan. 9—New automobiles sold in the 11 counties of southern California from Jan. 1 to Nov. 30, 1921, totaled 51,226, as compared with 43,148 in the same period of 1920. Los Angeles county absorbed 35,850 of the total. Sales of motor trucks in the same territory for the same period totaled 5646, of which 2794 were sold in Los Angeles county. Ford sales of passenger cars in southern California totaled 22,911. The other sales leaders in order were Chevrolet, Studebaker, Dodge, Buick, Overland and Oldsmobile.

SOMETHING NEW IN TIRES

Akron, O., Jan. 9—Frank A. Seiberling, founder and former president of Goodyear and now president of the new Seiberling Rubber Co., soon will introduce a new tire to be known as the "Seiberling Cord," the main structural innovation of which will be that the tread stock runs from bead to bead, eliminating the sidewalls. The new tire will be ready for shipment March 1 from Seiberling's two factories at Barberton, O., and New Castle, Pa.

20th Century Carries Fifty Chicagoans to Gotham Show

Heavy Representation Reflects Unusual Interest in Opening of 1922 Automobile Season

CHICAGO, Jan. 9—The following Chicago dealers were included among those who left Sunday for New York to attend the automobile show. This party was arranged by the Chicago Automobile Trade Association:

R. C. Cook	W. T. Morrow
John Nicol	J. R. Histed
James Levy	Geo. C. Norwood
C. G. Embleton	H. M. Allison
Arthur Jones	C. R. Dashiell
O. T. Mitchell	H. P. Branstetter
B. M. Wright	L. B. Southerland
H. M. McCard	A. A. Landry
W. E. Butler	R. E. Maypola
Frank W. Stewart	Edgar C. Frady
J. H. Wilkins	W. H. Farrington
Roy E. Cripe	W. J. Mead
Geo. H. Bird	Samuel Kraus
W. L. Beckley	R. C. Crist
Wm. R. Johnston	W. L. O'Neill
C. J. Slater	J. Edwards
C. P. Warner	S. Breakstone
Wm. E. Swanson	Eugene Silver
F. F. Hattram	F. J. McShane
Edwin Bluthardt	B. E. Adams
O. G. Heffinger	M. J. Sommers
W. J. Boone	H. Paulman
H. M. Holder	T. K. Morrow
D. M. Beal	W. D. Foreman
Mr. Johnson	Harry Hower
Thos. J. Hay	H. M. Fowler
Dayton Keith	Mr. Rottenberg

$1,000,000 TAX REBATE

Ottawa, Ont., Jan. 7—The Retail Merchants' Assn. of Canada is working in conjunction with the automotive dealers to secure a rebate of the luxury tax paid upon unsold cars when the tax was abolished on Dec. 22, 1921.

It is said that the sum involved is around $1,000,000, which will make quite a nice little sum for the dealers who were heavily stocked up when the tax was levied.

ASSOCIATION ELECTS OFFICERS

Jacksonville, Ill., Jan. 11—The Jacksonville Automotive Dealers' Assn., at its annual meeting, elected the following officers for the coming year: president, J. G. Berger; vice-president, Charles G. Strawn; secretary, E. A. Olds; treasurer, William McNamara. Committees were appointed to take the necessary steps in arranging for the annual show, the dates to be selected later, probably early in March.

GIVES EMPLOYES INSURANCE

Wichita, Kan., Jan. 11—More than $100,000 in group life insurance was presented to employes of the Price Auto Service Co. here last wek by Will G. Price, president. Each employe with three months' service received a policy for $500; one year service, $1,000; and for each additional year, $200, until a maximum of $3,000 is reached. The company pays the premium. No medical examinations are necessary.

Concerning Men You Know

J. E. Smith, sales manager of the Ford Motor Co., Montreal, has gone to Regina, Sask., where he is to take over the management of the Saskatchewan branch.

F. A. Morrison has been appointed assistant secretary of the Maxwell and Chalmers organization, Windsor, Ont.

George A. Richards, formerly Firestone manager in Detroit, has just associated himself with Harry L. Cunningham, in connection with the distribution of the new Rickenbacker car in Michigan. The new company is to be the Cunningham-Richards Co. Their headquarters will be in Detroit, from which point they will manage the affairs of the entire state of Michigan in connection with the distribution and service of the Rickenbacker car.

R. C. Chidester, of the Packard Motor Co., Milwaukee, took the office of president of Chidester-Frint, Inc., on Jan. 1.

Ralph E. Brown resigned as sales manager of the A. W. Haile Co., Buffalo, to become president and general manager of the Packard Buffalo Motor Car Co. Henry T. Myers, New England branch manager of the Studebaker Corporation, became vice president and general manager of the Haile Co. at the same time.

W. O. Rutherford, vice president of the B. F. Goodrich Co., has accepted the chairmanship of the foreign trade committee, which directors of the Motor and Accessories Mfg. Assn. decided at its last meeting to appoint.

C. C. Buxton, Chicago, who formerly distributed the Daniels, is now handling McFarlan.

C. H. Burke of the Chicago Sheridan Co., has contracted for the distribution of Davis cars.

J. P. O'Brien, president and general manager of the Detroit Electric Car Co., of Illinois, recently underwent a slight operation at the Mercy hospital and is recovering nicely.

A. J. Whipple, general sales manager for the Republic Truck Sales Corp., has resigned.

R. E. Stephens, president and general manager of the Stephens Corp., was buried at Maquoketa, Ia.

Jos. C. De Luc, former sales manager for the Chicago branch of the Locomobile Co., has formed De Luc Motor Sales Co., for Wills Saint Claire.

Charles C. Hollenbeck, general manager of the Pomeroy-Bray Motor Sales Co., Chicago, has returned from Green Bay, Wis., where he studied sales methods.

H. M. Leland of the Lincoln Motor Co., Detroit, has been offered the services of Congressman James of Michigan in connection with the $4,000,000 controversy concerning Federal taxes.

Albert E. Dundenberg, sales manager of the John Deere Plow & Tractor Co., Moline, Ill., is suffering from serious injuries received when his car skidded on the ice.

H. H. Taylor, Clinton, Ill., has sold his garage to Warner C. Volrath of E. St. Louis, Ill.

Frank L. Campbell has been appointed sales manager of the United States Chain & Forging Co., Pittsburgh, to succeed C. M. Power, who resigned.

H. D. Little, head of the wholesale department of the Willys-Overland Co., at Toledo, has resigned.

Walter Stewart, a former executive of the Willys-Overland Co., Toledo, has been appointed director of finance in the cabinet of Mayor B. F. Brough.

Capt. Robert W. A. Brewer of the British army, who is conducting experiments in the uses of gasoline throughout the United States, and at present in Buffalo, has been awarded the Bessemer premium by the Society of Engineers of England.

William C. Young has been made manager of aeronautical sales of the Goodyear Tire & Rubber Co., succeeding Willard P. Seiberling.

Connecticut Taxes Cause Lay-Up of Cars and Trucks

Hartford, Conn., Jan. 11—Increased cost of registration of cars in Connecticut and the added tax on gasoline, together with the increased price of the fluid, have exerted a disconcerting effect on those who motor. One Hartford battery station has already taken in 150 storage batteries for winter storage, something unheard of heretofore at this time of the year.

Increased cost of truck registrations rests heavily on some of the manufacturers, who have declared that they will lay up the cars rather than pay the high cost of gasoline plus the tax of a cent a gallon and the heavy registration fees which became effective Jan. 1. Present indications suggest a return to horses, those proposing to use them admitting that the horse is slower, but that they can make deliveries just the same. There are more trucks laid up for the winter than ever before. The opinion expressed in various quarters is that the state has gone tax-mad, passing the burden to the car and truck owners. And there is no relief for two years. Only the next legislature can change the situation.

LITTLE MOTOR KAR SOLVENT

Houston, Texas, Jan. 6—A jury in district court here has decided that the Little Motor Kar Co. was solvent at the time a receiver was appointed and that it still is solvent. In their petition to the court the trustees of the company charged that Everett S. Owens was appointed upon the request of holders of "gratuitous stock." The trustees have applied for the lifting of the receivership and have obtained an injunction prohibiting the sale of the plant as proposed by the company.

GIER-LEWIS NEW WHEEL

Detroit, Jan. 6—Announcement of a new steel wheel, brought out by the Gier Tuarc division of the Motor Steel Wheel Corp. of Lansing, was made coincident with the first annual sales meeting of the division and resulted in orders totaling approximately $100,000 for delivery before April 1. It will be known as the Gier-Lewis.

The new wheel is a radial corrugated disk steel wheel for use on lighter types of cars, the corrugated metal resembling in appearance spokes of a wood wheel. The Gier Tuarc wheel is for use on heavier vehicles.

ILLINOIS TRADE MEET JAN. 31

Chicago, Jan. 11—The third annual meeting of the Illinois Automotive Trade Assn. will be held at the LaSalle Hotel, Chicago, Tuesday, Jan. 31. The board of directors will at that time select the time and place for holding the state convention and also select a committee to nominate new officers and four new directors. Decatur is one of the leading candidates for the gathering this year. It is expected that the convention will be held some time in March.

Heavy and Light Vehicles in Relative Economy Tests

Government Research in Bureau of Roads to Determine Legislation in States

WASHINGTON, Jan. 11—Contending that it is important that a clear conception of the relative economy of heavy and light vehicles be given careful study, the Bureau of Public Roads in its annual report stressed the need of economic and engineering research before it may be necessary to place limits upon the size of vehicles by suitable legislation. These suggestions are particularly important at this time when many states are contemplating drastic traffic laws and regulations against the loading of motor vehicles.

The bureau stated: "For the security of the enormous investment which is now being made by the state and Federal government, it is imperative that this question of the duty which the roads will be called upon to render in the future shall be definitely determined."

As to an inquiry into the motor traffic problems of the future, the Bureau of Public Roads says: "Less urgent but no less important than the need for economic research is the necessity for careful investigation of the engineering problems of design and construction. The forces imposed upon the roads by modern traffic greatly exceed those of a decade ago. To withstand them it has been necessary to alter the design of road surfaces and foundations. In the absence of definite knowledge of the effect of the traffic and the qualities of the new types of surface, it has been necessary to resort to empirical processes. These must give way as rapidly as possible before more rational methods developed by scientific study."

The value of motor vehicles delivered to state highway departments as of Oct. 31 by the War Department was $74,730,568, and spare parts were valued at $11,731,424.

It will interest automobile manufacturers and dealers to know that the chief of the Bureau of Public Roads has recommended a series of investigations as to the use of machinery and power on farms in ensuing years, in order to form a valuable record concerning trends and tendencies in the purchase and use of equipment by farmers.

NEW BOWSER PUMP

Fort Wayne, Ind., Jan. 6—Supplanting a pump that has found a world market for the past eight or nine years, a new Bowser gasoline five-gallon, retailing pump is to make its appearance shortly, according to the officials of S. F. Bowser & Co., Inc., of this city. It will be known as "Chief Sentry." The new pump has a sight glass in the discharge arm, showing the level of gasoline and assuring the customer that the pump is full when pumping begins.

Annual Statement of GMC Shows Financial Strength

Corporation, Through President DuPont, Declares Preparedness for Coming Year

NEW YORK, Jan. 7—The directors of the General Motors Corp. at their meeting here omitted the dividend upon the common stock due to be declared at this time. The regular quarterly dividends upon the other classes of stock were declared as follows: six per cent, $1.50 a share; six per cent debenture, $1.50 a share; seven per cent debenture, $1.75. These dividends are all payable on Feb. 1 to stockholders of record at the close of business Jan. 14.

Pierre S. DuPont, president of the corporation, issued a statement following the meeting in which he said:

"The past year has demonstrated satisfactorily the large earning capacity of many of the more important divisions of the corporation, the aggregate profits of which, even under the adverse conditions that have obtained in the automobile industry, are estimated to have been in excess of the amount required for dividends on the debenture, preferred and common stocks. On the other hand, substantial losses were made by other divisions due mainly to large inventories carried at high prices in the face of a constantly declining range of prices for the finished product and also to extensive commitments entered into in the earlier part of 1920 for parts and supplies at the high prices then prevailing.

"The corporation is in a strong position financially. Inventories have been greatly reduced, and bills payable which amounted to about $72,000,000 on Dec. 31, 1920, have been reduced to about $49,000,000 as of Dec. 31, 1921, and cash on hand in banks amounting to approximately $41,000,000. Accounts payable and other quick liabilities have likewise been reduced, viz., from about $42,000,000 to $30,000,000. After writing off all determinable losses and writing down inventories, the ratio of current assets to current liabilities as of Dec. 31, 1921, will be approximately two for one.

"The corporation's plants have been maintained in a high state of efficiency. Substantial economies have been effected in many directions and others are in contemplation, and most satisfactory progress has been made in improving the character and raising the standard of the corporation's product to the end that it will be enabled effectively to meet competitive conditions and maintain its position in the trade."

CONCRETE ROADS DOUBLE

Chicago, Jan. 11—In 1921 there were laid 62,000,000 sq. yds. of concrete highway pavement, equivalent to 6000 miles of 18-ft. road. This is nearly double the amount laid in any other year.

1922 Will Be a Year of Growth

By Charles Clifton, President, National Automobile Chamber of Commerce.

NEW YORK, Jan. 7—The production of 1921 probably will not be exceeded in 1922; but this is only one particular in the scope of motor transportation. More attention will be paid to the needs of the individual owner. The repair parts business of the factories will be better organized. Governmental and other agencies will carry on studies of transportation costs which will effect owner economies. Road development will give the motorist more value per vehicle. The export market will be better. In fact, if the allied debt is refunded, foreign trade will be immeasurably improved, as the exchange rate will then readjust differences in currencies on a basis of comparative purchasing power.

Many companies are giving and have given splendid service to their owners, but for the industry as a whole there is great opportunity for growth. It is a complex situation to deal with, because good service to the owner is a matter of personal contact with the local man in the field. Fortunately, time is gradually eliminating those local shops which have not served the customer well. Time also is giving the local man a chance to know what the motorist wants. 1922 will give many factories an opportunity to study their service situations throughout the country and to aid their local dealers in giving satisfaction to the car owner.

Michigan Outlines Policy to Control Truck and Bus Lines

Detroit, Jan. 11—The Michigan Public Utilities Commission through its chairman, Sherman T. Handy, has outlined its policy toward controlling motor truck lines. The commission will endeavor to prevent dissipation of utility property by unfair and unnecessary competition. Bus routes are already under state control in Ohio.

"When the legislature seeks the cooperation of this commission in drafting legislation for the regulation of motor truck transportation, we will recommend such legislation as will protect the pioneer, stable and serviceable interests then engaged in it from unfair and unnecessary competion to the end that a fair return may be received on the investment and a fair grade of service rendered to the public," said Handy.

Handy believes manufacturers operating their own truck lines could not be designated as common carriers. Authorization of motor truck lines parallel to existing serviceable transportation routes is regarded as unlikely. "Loss to the public inevitably follows unreasonable and unnecessary utility competition," says Handy.

MICHIGAN DAY AT SHOW

Detroit, Jan. 9—Michigan day will be observed at the Detroit show on Jan. 25, when special preparation will be made by the Detroit Automobile Dealers' Assn. to entertain visitors from all over the state territory. On this day a semi-annual meeting of the Michigan Automotive Trade Assn. will be held at the Statler, preceded by a dinner, arrangements for which are now being made by W. D. Edenburn, manager. Following the meeting the association members will attend the Detroit show in a body.

CONFIDENCE IN 1922

Fort Wayne, Ind., Jan. 11—Business in 1922 will be good, according to S. B. Bechtel, president of S. F. Bowser & Co., Inc., manufacturers of gasoline tanks and pumps, of this city. Bechtel says, "Reports from our sales organization, which covers all sections of the country, show considerable improvement in general business conditions, and our sales managers and salesmen are optimistic and even enthusiastic over the outlook for the year. We think their view is well founded; that the worst of the business ills have been cured, and that business in general will gradually increase. We believe that 1922 will be a very satisfactory year."

VELIE PRODUCTION 500 MONTHLY

Moline, Ill., Jan. 10—Early revival of 1922 business is forecast by the Velie Motors Corp., which plans to employ 500 men during the month and reports advance orders for 1600 cars on its books. Production is now on a 500-cars-a-month basis, and as soon as the Marion, Ind., motors plant reaches its capacity, will probably go to 800 monthly.

The 1922 campaign centers about a new five-passenger car, designed by A. W. Patty, and enthusiastically endorsed by recent gathering of 100 dealers from all over the country. The machine was first turned out in a seven-passenger design, but the dealers who united in its approval decided that "the public wants a five-passenger car, easier to manage and cheaper in upkeep."

Features of the new car are the rounded radiator, full-crowned fenders, drum-type headlights, removable tonneau light on cord which will serve as portable light, parking lights on the cowl, solid black walnut edging around the entire body, four-bearing crankshaft, and direct power from overhead valves.

TRADE ASSOCIATION TRUSTEES

Seattle, Wash., Jan. 6—Kenneth McAlpin, president of the King county division of the Washington Automotive Trade Assn., has named the following as trustees for the coming year: H. E. Komitsch, Robert S. Taylor, Fred Hill, William O. McKay, James J. Gravley, Bruce Griggs and Howell Tatum.

In the Retail Field

Baalim Motor Co., Lethbridge, Alta.,, Chevrolet dealers, have started a scheme to enable their prospects to buy cars. It is called a Springtime Club, the idea is that the prospect pays $195 in cash now, leaves it in this club until May 1, 1922, drawing 7 per cent interest. On May 1 the prospect gets delivery of a car and the balance is payable at $10 a month.

Pioneer Automobile Co., San Francisco, was destroyed by fire late in December. Twenty-eight of 30 Peerless cars and 150 of 250 Buicks were destroyed. A loss of nearly half a million dollars is estimated.

Strattom-Portlock Co., Memphis, accessory dealers, have taken over the local distribution of Willard storage batteries.

Goodell & Annis have assumed management of the Mansion House Garage, Greenfield, Mass.

Abramson & Plummer Co. has been organized in Aurora, Ill., and will deal in accessories and supplies.

Decatur, Ill. Auto Exchange has moved into larger quarters.

Harper & Harper, Philadelphia, have been appointed distributers for Hupmobile in Philadelphia territory.

Packard has opened a branch salesroom in Evanston, Ill.

Fashion Auto Sales, Chicago, has moved to new quarters.

Federal Truck has opened a Chicago branch.

Fuller Storage Battery Co., Hartford, Conn., Willard battery distributors, has a standing offer of cash prizes to employees making better business suggestions.

L. & H. Motor Co., Hartford, Conn., Hupmobile distributors, entertained its sub-dealers with a dinner at the Hotel Bond.

Rue Motor Co., Chicago, has sold its Ford franchise and business to the Callahan-Krause Corp., and will move to new quarters to handle Fordson implements.

O'Brien Bros. Motor Co., Stanley Steamer distributors in Chicago, has moved to larger quarters.

Rogers Park (Ill.) Motor Car Co. has changed its name to Gordon-Drumm Motor Co.

Winnetka (Ill.) Motor Co. is now handling Dodge Bros. cars.

Bliss Auto Sales Co., Toledo, has been made distributor for Hudson and Essex cars here and in 17 counties in northwestern Ohio.

Sturtevant-Jones Co., Toledo, will distribute Hupmobiles in 25 counties in Ohio.

S. Y. Brigham Motor Co. has been appointed to distribute Durant cars in Toledo territory.

Paige-Ohio Co., Toledo, will distribute the new Jewett car.

Ballou & Wright, Portland, Ore., distributors on the Pacific coast, have moved into new quarters.

Pfeffer Resigns as Head of Saxon Motor Car Co.

Detroit, Jan. 11—The resignation of Clarence A. Pfeffer as president of the Saxon Motor Car Co. has been accepted by the board of directors. Until a successor is chosen the affairs of the company will be in charge of Harry L. Bill, vice-president and general manager. It is understood that the directors have practically decided upon the man who will take over the destinies of the company, and he is said to be thoroughly experienced in financial affairs. The company will undergo several constructive changes under the new administration, it is declared.

The resignation of Pfeffer brings to an end three years of service for the reorganized Saxon company. For the present he will act as a business consultant, specializing in the automotive industry.

TO REMOVE SNOW

Columbus, Ohio, Jan. 6—The good roads board of the Ohio Automobile Assn. which is composed of about 70 automobile clubs of Ohio, has taken action for the prompt removal of snow from the highways of the state during the winter months. It is held that prompt removal of snow tends to preserve the surface of improved highways. Bulletins showing the cost of removing snow have been sent to all clubs of the state and the cooperation of the association is given to the Ohio Highway Commission to bring about the removal of snow.

DALLAS DEALERS ELECT

Dallas, Tex., Jan. 6—Discussion of the used car problem in Dallas, planning for the annual spring style show, hearing reports of better business and election of officers, featured the annual meet of the Dallas Automobile Trades Assn.

F. E. McLarty was elected president of the association for the ensuing year; William Morris, first vice-president; J. F. Roach, second vice-president, and H. E. Spencer, third vice-president. J. H. Shelton was reelected secretary.

The report of J. H. Connell, retiring president, showed that more than 2100 new automobiles and trucks had been sold by retailers in Dallas during the past 70 days, and he thought this indicaated better business in the trade. He said the business in Dallas is in healthy shape, with prospects brighter than they had been for some time.

INDICTS INVESTMENT FIRM

Boston, Jan. 6—Federal indictments have been returned against officers of Hollister, White & Co., Inc., investment underwriters, charging them with using the mails to defraud. It is charged that the company reorganized several corporations and that false financial statements were issued to promote the sale of stocks and bonds issued by these companies. Among the companies alleged to have been manipulated are the Hartford Automotive Parts Co. and the Spillman Motor Co.

SPRINGFIELD BODY PLANTS BUSY

Springfield, Mass., Jan. 11—Production of automobile bodies has entered upon a period of expansion in this district. The Auto Metal Body Corp., which builds Hupmobile bodies, has projected an early enlargement of its works. The All-Metals Co. is negotiating for a building in which to engage in the manufacture of bodies. Springfield Coach Works has bought the land and buildings on which its plant is located, and in the near future will erect a building specially adapted to its need. Smith-Springfield Body Corp. is being operated at its full capacity of 250 employes. Rolls-Royce, Stevens-Duryea, Mercedes and Minerva are among the makes fitted with Smith-Springfield bodies.

Lincoln to Continue Leland Built Under Attorney's Plan

Raises $5,000,000 Offer for Property to $8,000,000; Sale Set for Feb. 4

DETROIT, Jan. 11—Lincoln cars will continue to be "Leland-built" under the plans of the group which offered $8,000,000 for the Lincoln Motor Co. property in Federal court here this week. The offer was made by Harold H. Emmons, attorney for the company, who said he was acting for "persons interested in getting the company back on its feet."

The first offer of the group was of $5,000,000 for the unencumbered property of the company, and this was increased to $8,000,000 following the fixing of this figure by the court as the upset price. Date of sale was set for Feb. 4. The appraised value of the company is $11,000,000, and its liabilities approximate $10,000,000.

The original offer of $5,000,000 caused such a storm among attorneys representing different classes of shareholders and creditors that Judge Tuttle decided to raise the upset price to $8,000,000.

One attorney asserted the $5,000,000 would pay only half the debt and wipe out the shareholders of the A and B classes. Another contended that $5,000,000 would pay only about 22 cents on the dollar to creditors. He estimated the liabilities at $9,000,000, and said that when preferred creditors were paid there would remain only about $2,000,000 for the remainder.

If the group represented by himself is successful in acquiring the property, Emmons, said, the Lelands will be continued in the active management of the company. Speedy lifting of the receivership and the continuance of manufacturing by the company is important to keep the sales organization intact, he said. With the company again in control, the impression is that an early revision in prices may be expected, which would place the Lincoln in a much more active selling class.

The slash in assets made by the appraisers has had the highly desirable effect of placing the company on a strictly present-day valuation basis.

Officials of the Treasury Department at Washington will be asked by the receiver to consider the writing off of the $500,000 balance remaining on the original $4,500,000 claimed for unpaid taxes. This will not be a formal appeal from the decision reducing the claim to $500,000, but the writing off will be presented as greatly facilitating the recovery of the company. Stockholders and creditors considered the offer of $8,000,000 for the company made by Emmons at an informal meeting Tuesday, with a view to determining their attitude on the proposed purchase. There is a likelihood of another bid being entered from this quarter.

Business Notes

Master Tires, Ltd., Toronto, is a new concern incorporated in Ontario, with a capital of $1,000,000, to manufacture tires and rubber goods.

Colonial Motors, Ltd., capitalized at $1,000,000, is negotiating for the purchase of the factory of the Canadian Detroit Lubricator Co., at Walkersville, Ont., and plans to start manufacturing a new five-passenger auto as soon as possible.

The General Motors Pontiac truck plant resumed operations this week, following the usual shutdown for inventory.

The Canadian Lever Springs, Ltd., is a new concern incorporated in Ontario to manufacture springs for automobiles and trucks. The company, which holds patent rights for Canada, on a lever spring now manufactured in the United States, will establish a factory in Peterboro, Ont.

Spring & Auto Parts, Itd., a new company, has been incorporated to manufacture springs, motors, engines, carburetors, automobile accessories, etc., with $50,000 capital stock, in Toronto, Ont.

Tri-State Tire Co., Memphis, has been incorporated to do a general tire business.

Pointer Signal Co., Decatur, Ill., has been incorporated and will manufacture a new road signal.

Lehigh Rubber Co., New Castle, Pa., has been incorporated. This firm recently took over the New Castle Rubber Co.

Consolidated Distributors, Inc., of New York, creditors will hold a meeting Jan. 18 at the Hotel Astor.

Kelly-Springfield Tire Co. voted to pass the regular quarterly stock dividend of three per cent to holders of common stock.

Wayne Wheel Co., Newark,, N. Y., manufacturers of wooden wheels, has filed voluntary petition of bankruptcy in a U. S. court at Buffalo.

Spencer-Smith Machine Co., Howell, Mich., are now in production of 20,000 pistons for the Ansted Engineering Co., Connersville, Ind.

Kalamazoo Motors Corp. has issued $250,000 seven per cent gold bonds.

General Tire & Rubber Co., Akron, had sales in 1921, according to its annual statement, which exceeded those of 1920. General sales for 1921 exceered $6,000,000 in money volume, while in tire units they exceeded those of 1920 by more than 50 per cent.

Monitor Motor Car Co., Columbus, Ohio, in the hands of a receiver, will be sold at auction Jan. 17. The inventory value of the property is $300,000.

Harley-Hendee Transfer Is Made to Morris Syndicate

Springfield, Mass., Jan. 11—Transfer of the Harley company from the Hendee Mfg. Co. to a syndicate headed by A. W. Morris, formerly production manager of the Harley company, has been completed. Associated with Morris are R. E. Northway of Boston, who recently retired as vice-president and director of Northway Motors Corp.; Charles H. Burr, of Philadelphia, and J. A. Young, of Fredonia, N. Y.

Morris has accepted the presidency of the new company and will install his high pressure die casting process used successfully during the war for casting all metals. In addition to casting work, the company will handle a variety of drop forgings up to medium size crank and camshafts. In addition to its own plant, it has a close connection with a company in Bridgeport, Conn., which has a large machine shop, and will be in a position to finish automotive parts or complete assemblies.

The new company will have headquarters at the Commodore Hotel during show week and will be represented there by Morris, Northway and J. A. Young, formerly eastern representative of the Sheldon Axle Co.

INDIANA FACTORIES BUSY

Muncie, Ind., Jan. 10—January will see the addition of hundreds of employes to Muncie factories, and the local automotive concerns are among the most active in the announcements of more workers for the first month of 1922. William H. Lyman, general superintendent of the Warner Gear Company, says the working force will be increased by 200 people in 60 days, which with those now employed, will place the concern on a 50 per cent operating basis.

Two hundred additional men will go to work in the Muncie Gear Plant next Tuesday, which will place the concern at 85 per cent of its capacity.

The Durant Motors of Indiana, which bought the Sheridan factory, is preparing to put several hundred at work on making and assembling the Durant Six.

MEXICO BUYS 5,885 CARS

Monterey, Mexico, Jan. 11—According to a statement issued by the department of finance of the Mexican government, there were imported into this country during the first 10 months of 1921 a total of 5,885 passenger automobiles, purchased in the United States, for which the sum of $4,470,307 was paid. This was a notable increase over the number of passenger cars imported from the United States in 1920, the record for that year being 2,860 cars, valued at $2,469,025. During the year of 1919 the total number of passenger automobiles purchased in the United States and imported to Mexico was 2,251, valued at $1,812,628. The figures for 1921 will show a still greater increase when the importations for November and December are added, it is explained.

MONROE PLANT SOLD

Indianapolis, Jan. 11 — The William Small Co., maker of the Monroe automobile, which has been in the hands of a receiver since August, 1920, was sold in a receiver's sale here Dec. 28 to the Fletcher American National bank, a local creditor, for $175,000 cash. It is understood that a reorganization of the company will be consummated soon, and that pending that, the production will be continued.

BODY PLANT OPENS

Atlanta, Ga., Jan. 10—The Fulton Auto Body Co., of Atlanta, opened its new plant the latter part of December, manufacturing custom made bodies and sport bodies for the Ford chassis. The company is headed by Charles Drager, selling mainly through dealers in the southeastern territory.

Indianapolis Speedway in Preparation for 1922 Races

Entry Blanks Are Out for Memorial Day Classic With Its Prizes Amounting to $100,000

INDIANAPOLIS, Jan. 11—The Indianapolis Motor Speedway will stage its tenth 500-mile International Sweepstakes May 30, on the 2½-mile brick oval. As in previous years, the race carries the largest cash award of the season for an automobile speed contest, with $50,000 total and $20,000 to the winner.

Entry blanks have been placed in the mails and responses from American and foreign drivers are expected daily. Conditions for the race are the same as in 1920 and last year, with the maximum engine size placed at 183 cu. in. However, the weight conditions differ from former years. The maximum piston displacement cars, that is, cars up to 183 cu. in. and not less than 123 cu. in., is 1650 lbs. minimum without gasoline, oil or ballast of any kind. For the driver entering a car in the two-liter class, i. e., 122 cu. in. engine content or under, new weight conditions have been announced this year. The engine of 92-122 cu. in. rates a minimum weight of 1400 lbs., while cars with 91½ cu. in. or less can start with a minimum weight of 1200 lbs.

It is provided that in event of rain May 30 the race will be run on May 31. Entries will be accepted up to midnight on May 1.

The entry blank shows, in addition to the cash prizes, two famous trophies, the Prest-O-Lite silver brick to the driver leading at 300 miles, and the Wheeler-Schebler Cup, the largest silver trophy in existence, to the leader at 400 miles. The $50,000 purse is divided as follows: $20,000, $10,000, $5000, $3500, $3000, $2200, $1800, $1600, $1500 and $1400. This fund will be more than doubled by accessory and lap prizes.

PISTON RING MERGER

Connersville, Ind., Jan. 11—A merger uniting the Wainwright Engineering Corp., of Connersville, which makes pistons and piston rings, and the McQuay-Norris Manufacturing Co., of St. Louis, known as the largest manufacturers in the same field, was announced here today. The Connersville plant will be known as the McQuay-Norris Manufacturing Co., of Indiana, Wainwright division; and Harry A. Wainwright, who has been vice-president and general manager of the local company, will continue in the same capacity for the local division of the merger, and the plant will continue in Connersville.

$8,500,000 GARAGE BILL

Philadelphia, Jan. 11—A feature of the year's building statistics report for this city is its record of 1569 garages erected at a total estimated cost of $3,505,695, which was $500,000 more than the cost of the manufacturing plants erected in 1921.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Starting a Battery Service Station

Q—Kindly give us any information you may have relative to starting a battery service station. Suggest a good line of batteries to handle.—T. H. Sachs, Whitehall, N. Y.

You particularly ask us to suggest a good line of batteries on which to specialize, and what apparatus, materials, etc., you would require. We do not believe that it is within the province of MOTOR AGE to suggest what line of battery you should handle. We would suggest that you make a list of the good batteries, from the advertisements in MOTOR AGE, and then canvass your community and see which of these are represented there and which in your opinion should be represented because of the needs of your community. It is very evident that if you take up a good battery that is not now handled in your community, that you would have a better opportunity of building up a business quicker than if you selected a battery that is already represented there.

Sell in Competition

It frequently happens that a battery is represented in a community, but is not well represented because of the personality, or the business methods of the local representative. In that case you probably would be justified in starting a competing business; and it is frequently the case, where this situation obtains, that the battery company is quite willing to make a change.

As to your further requests for materials: the list is quite too long to print here. MOTOR AGE printed a series of three articles on the proper equipment of the "Ideal Service Station." These appeared in MOTOR AGE December 18, 1919; December 25, 1919, and January 1, 1920. If copies of these issues are available to you, I believe you will find the complete information in them. If these issues are not available to you and you care to see them, we probably can help you in getting this information.

Shop Management

We are sending you a small catalog of the U. P. C. Book Co., in which is marked a book that treats very thoroughly on the subject of battery service shop management and equipment.

We believe, also, that if you have decided what battery you wish to represent, the manufacturers of this battery will be glad to give you the information as to what equipment they believe is required for the best conduct of the business in a community such as the one you expect to open your business in.

The Readers' Clearing House

THIS department is conducted to assist dealers and service station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and P. L. Dumas; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; General Business questions by MOTOR AGE organization in conference.

CHATTEL MORTGAGE HAS PRIORITY OVER REPAIR LIEN

Q—I have a truck in my garage which I repaired and I would like to know just where I stand on the matter. Following are the circumstances:

About September 10 a party who was working on the road here brought in his truck for repairs. I found it necessary to have the cylinder block welded and reground, as it was scored very badly. This regrinding necessitated fitting new pistons, along with several parts needed to put it in first class condition, as same were burned out. The amount of the bill was $180 for parts and $60 for labor.

I finished repairs the first of November, and when the party came for the truck, I would not let him take it away as he had no money to pay the bill. I afterwards found that this party had purchased the truck from Mr. B for $4,000 and had turned in another truck for an allowance of $1200, which is all that he has paid on it. Mr. B took a mortgage on the truck when he sold it for the balance and had it recorded where he lives, as well as in the place where the party whom I was dealing with lived.

They took court action and have repossessed the truck. They sent a man to get the truck from me and I would not let him have it until my bill was paid. They contend they do not have to pay the bill, and also contend they can take it out of my possession. Where do I stand in this matter? The party who brought the truck in to me has nothing, so there is no chance to collect from him. Have I a right to take out parts which I paid for and put in the truck? It seems that as I have the truck in my possession I can hold it until the bill is paid.—Lewis W. McCue, Goodells, Mich.

Your question concerns which takes priority as a lien claim on the truck, a prior recorded chattel mortgage or your own lien for repairing same? And the answer is that the chattel mortgage, becoming a lien before your own, has the first rights. Now, if the truck should be sold for an amount greater than the mortgage charge, you would share in the amount left after the mortgage was satisfied.

Some few states have laws that give a repairman priority in his repair lien over a prior mortgage, on the theory that the mortgage holder, by permitting the mortgagor to retain possession, impliedly gives him authority as his agent to order repairs and other necessary things. Such laws would be a boon to garagemen besides being eminently just, but unfortunately few states have been able to work out or arrive at such a law.

If you have the truck in your possession and you can remove the parts without injury to it, I see no reason why you may not remove them.

S. A. E. HORSEPOWER FORMULA

Q—Advise how to figure the horsepower of any engine.—George Barckloff, Box 205, Yukon, Pa.

The S. A. E. formula for determining horsepower is as follows:

"HP" equals "B" squared by "N" divided by 2.5.

Where "B" equals bore of cylinder

Or "B" equals bore squared

"N" equals number of cylinders.

"2½" equals constant by which the above values are divided.

CALCULATING CUBIC DISPLACEMENT OF CYLINDERS IN INCHES

Q—In the Dec. 8 issue of MOTOR AGE you published a formula for figuring cylinder volume. I have not been able to figure it out and would like to know if you would explain it more fully.—Albert Cohn, Independence, Mo.

The formula for finding the volume of a cylinder is area of the base times the altitude. To find the area, multiply the square of the bore by the constant, .7854. The square of any number is the number multiplied by itself; for instance, the square of 4 is 16. Having found the area of the cylinder, multiply by the stroke, which equals the altitude in the formula. This will give the displacement in cubic inches for one cylinder; multiply this by the number of cylinders, which gives the total cubic inches displacement of the engine.

WANTS WIRING DIAGRAM OF RUSSELL KNIGHT

Q—Advise address of a Rudge-Whitiworth wire wheel distributor, and also the factory address.

2—Publish wiring diagram of Russell Knight model 14-28.—Christie's Auto Repair Shop, A. Christie, Prop., Yorkton, Sask., Canada.

1—The Rudge-Whitworth wire wheels are sold in Chicago by a factory distributor, the Standard Sales & Service Co., 1806 S. Michigan Ave. The American manufacturer of this wheel is the Marwin-Rockwell Corp., whose offices are located at 347 Madison Ave., New York. The parent factory is in Great Britain.

2—We have no data on the Russell Knight. If you will tell us the make and model and frame numbers of starter and generator, we will doubtless be able to supply you with a wiring diagram.

WANTS 16-VALVE HEAD FOR CHEVROLET

Q—Give the names of manufacturers who build 16-valve head for a Chevrolet 490 engine.

2—Would there be any advantage in using two carbureters, one to each pair of cylinders? If so, what kind would you suggest?—Theron K. Wright, San Angelo, Tex.

1—We know of no firm making a 16-valve head for a Chevrolet 490 engine.

2—The only advantage to be gained by two carbureters on a four-cylinder engine is better acceleration. Any of the well-known and well-advertised carbureters should do the work successfully.

BATTERY PLATE EFFICIENCY

Q—Are there any battery manufacturers who use the Pedro G. Salom method of making plates?

2—Is it true that the voltage is increased five per cent with this construction?

3—Is the capacity increased 25 per cent?—C. Arthur Fox, Cedar Rapids, Ia.

1—We know of no battery manufacturers using the method named. In fact, we have never heard of the Pedro G. Salom process. Perhaps some of our readers have heard of and know the details of this process.

2—Refer to Answer 1.

3—Refer to Answer 1.

PUZZLING KNOCK IN FORD

Q—I have noticed that in the wiring diagram of the 1920 six-cylinder model Buick the shunt field and third brush is connected to the ignition coil. Give reason for this.

2—A Remy coil on a 1920 Chevrolet 490 went wrong when the engine idled. It would run all right at low speeds, but when we attempted to accelerate, the engine would stop. The coil was replaced with a new one and the engine ran all right. The old coil was taken apart and the primary winding seemed rather black in some places. Is the secondary winding insulated, or is just every row of turns insulated?

3—Is there any difference in the Stutz car and the H. C. S.?

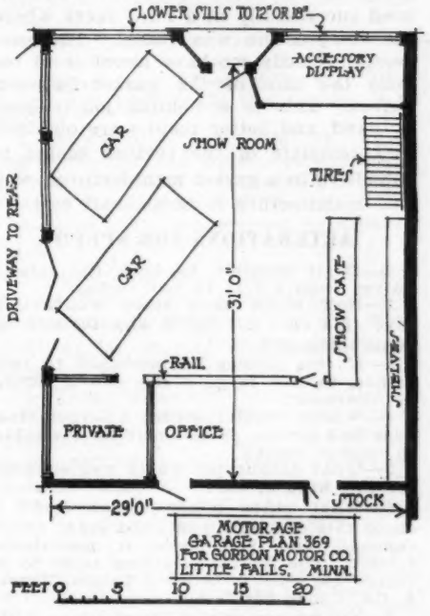
4—How could the knock be taken out of a brand new Ford, without starter, that seems to be in the timing gear? The new car has been run about 21 miles. When would this timing gear knock be heard?—Constant Reader, Algoma, Wis.

The current is taken from the shunt field connection because of the internal connections of the motor generator. This utilizes third brush regulation which is through shunt field and third brush. The current supplied to primary of coil is approximately constant with this system. The blackening of the secondary windings is due to a leak some place in the secondary installation. The secondary should be insulated between layers, especially where the windings have a chance to leak through to a ground.

3—There is a great difference between the Stutz and the car known as the H. C. S. The Stutz is made by the Stutz Motor Car Co., Indianapolis, and utilizes a Wisconsin engine. The H. C. S. uses a Weidley engine.

4—Timing gears rarely knock unless there is some foreign substance of considerable size lodged in the teeth. They will produce the loudest voice at speeds where the camshaft rotation is jerky. On the car it will be at a car speed of about 15 to 20 miles per hour or slower. Test for loose main bearing and piston stop before condemning the timing gears. Then inspect the timing gears. If the examination proves they have too much backlash, remove both of them and replace them with new gears. As it requires considerable work to remove the camshaft gear, it would be best to replace the camshaft gear only at first. Operate the engine with the new camshaft gear. If it has excessive backlash, the crankshaft gear also will have to be replaced.

Salesroom Suggestion



A SALESROOM LAYOUT No. 369

Q—Can we impose on your good nature to ask you to assist us in properly laying out our showroom floor for

Display space for two cars

Show cases and wall cases for accessories

Office space.

We are enclosing a rough (very rough) sketch of our present display floor space, and any assistance you can render will be greatly appreciated.—Gordon Motor Co., Little Falls, Minn.

The first thing advisable is to lower the window mills to within 12 to 18 in. of the floor, so that your show windows will be of some advertising value. One of them can be fitted up with a platform for accessories and tires, while the other should be left clear to permit a car being placed close to it.

With a space of this size, it is hardly possible to separate the accessory store; a show case and shelves at one side as shown, will answer very nicely and make it possible for the office force to assist the accessory salesman when necessary.

If the driveway is narrow, the car entrance into the showroom must be made rather wide, as most of the turning must be done while going through.

HEAT TREATMENT FOR EXPANDING WORN PISTONS

Perhaps MOTOR AGE readers will be interested in the heat treatment I have been using for expanding worn pistons. The procedure, which has given very good results in several cases, is as follows:

Build up a brick furnace, making it as tight as possible. Heat the enclosed area to a low red heat before placing the pistons inside. Hold the pistons at a cherry red heat, as even as possible, for one-half hour. Allow them to cool as slowly as possible, protected from drafts.—L. P. Bicknell, Calif.

The contributor failed to mention what kind of fuel he used, but this point seems to be of immaterial importance, as there are records of cast iron steam valves which have grown in size from being subjected to heat as low as 560 deg. A former article to which the contributor refers recommended that the pistons be buried in charcoal and left until completely cold.

(We thank L. P. for this contribution, and if he will favor us with his full name and address we will be pleased to express our appreciation by personal letter.—Ed.)

Gratifying Experience With Fordson Valves

We noticed in an issue several months ago that one of your readers asked the advisability of installing Fordson valves in a Ford. Since that time we have installed them in a 1916 roadster and, under hard use for the past two months, they have proved very satisfactory. This engine also has a Bosch magneto, Master carbureter and 4 to 1 gears in the rear axle. This combination gives a most surprising pick-up. Those who wish to change the gear ratio to 4 to 1 will be interested to know that they can procure a ten tooth pinion from the Ford Motor Co. This, installed with the stock ring gear, gives the wished 4 to 1 ratio. As intimated above, we have found it very satisfactory.—C. Wallace Gross, care Ford Sales & Service, Monrovia, Calif.

STORAGE BATTERY DATA

Q—What are the positive plates composed of?

2—What quantity of each?

3—The negative plates?

4—How much oil is necessary to lubricate a two-cycle engine of 3½ hp.?

5—Publish wiring diagram showing how to charge Ford magnetos from 32-volt direct current.—A. W. Georgeson, Hamberg, N. D.

1—The composition of the various pastes used in storage battery manufacture is a trade secret with the different makers. The oldest of the paste active materials is litharge, and sulphuric acid used in the mixture is about 1.120 specific gravity; the proportion of liquid to litharge is about 1 to 6. The mixing should be very thorough and as little acid as possible used. After filling a grid, the plate is subjected to pressure and all the portions of the grid filled, the entire combination being tightly compacted. The plate is then dried in air. The drying usually takes about two weeks unless the plates are dried in an oven. The oven temperature should be about 195 deg. Fahr. The plates are again dipped in acid of a gravity of 1.100 and dried, to further harden, and are then ready for service.

Another of the active materials most commonly used is litharge (PBO_{34}) for pasting the negative, and minimum or red lead (PB O) for the positive. The negatives are connected as cathodes with "dummy" plates of sheet lead as anodes, and current passes through the group. The PBO_{34} on the positive plates is changed to PBO_2 by the addition of oxygen, which is supplied by connecting up against dummy plates in a sulphuric acid bath and passing current through the couple, the dummies being connected as cathodes and the positive plates as anodes.

2—Refer to above answer.

3—Refer to above answer.

4—Half a pint to every three or four gallons of oil. Use the heaviest grade of good oil.

5—This is shown in Fig. 2.

WIRING DIAGRAM OF 1916 KISSEL

Q—Publish wiring diagram of Kissel 1916, model 4-32.—Pacific Motor Car Co., Pacific, Mo.

The wiring diagram for this car is shown in Fig. 1.

INSTALLING OVERSIZE VALVES ON FORD

Q—In regard to question of Mr. Ed. Johnson on page 42 of the Dec. 1 issue of MOTOR AGE, he stated that his Fordson valves strike the head, He will have to set the head up in a drill press or milling machine and cut away the metal of the same with an end mill. Only a little will need to be taken away, about ⅝ in. deep. This is also necessary when Dodge valves are installed. I think if he uses a gasket of 3/16 in. copper as soft as he can get it, and is sure all surfaces are as flat as possible, it will overcome the difficulties referred to.—Ctis S. Sawn, Worcester, Mass.

Note—We heartily agree with Mr. Sawn on this milling away a portion of the cylinder head to allow clearance for the valves. Regarding the solid copper as a cylinder head gasket—it will work all right where compression has not been raised, but we have never seen it used successfully in a Ford racer where the compression was raised. The successful remedy we have heard is to reduce the size of the gasket between valves. This is a ticklish job if done by hand, and better results are obtained if a template of the revised gasket is submitted to a gasket manufacturer, who will manufacture it at a small cost.

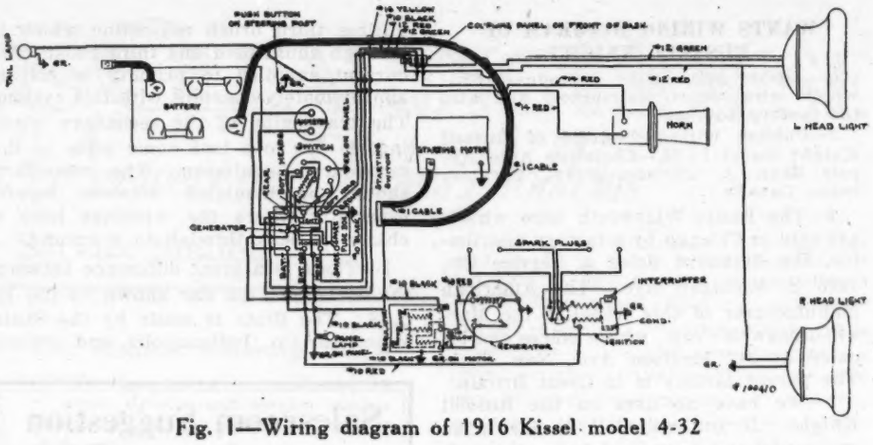


Fig. 1—Wiring diagram of 1916 Kissel model 4-32

ALTERATIONS FOR SPEED

Q—Is it possible to bore the intake valves from 1 9/16 to two inches?

2—How much more speed would this give this car, not using any fenders or runningboards?

3—If this cannot be increased to two inches, to how large a size can it safely be increased?

4—Where could I secure a larger ring gear and pinion, or would it be advisable to change same?

5—What carbureter would you suggest for this kind of car?

6—What other minor things could I do to this car that would not incur great expense, and yet make it materially faster? The above questions refer to a Dodge car.—B. T, Clifton, Tatum-Clifton & Co., Cedar Bluff, Ala.

1—No, on account of interference with the cylinder head gasket. Most of the successful Dodge racing cars use a Hudson Super-Six valve.

2—This cannot be stated accurately, but approximately 8 to 10 m.p.h. more if a larger carbureter is fitted.

3—Refer to answer one.

4—If the car is to be used on half-mile and mile dirt tracks, we would not recommend increasing the gear ratio. If maximum speed is desired over smooth straight stretches, you could install a 3 to 1 gear, which would give about the maximum speed possible. The names of firms supplying special gears will be supplied by letter.

5—Any of the leading carbureters would give good service on this engine.

6—Advance the valve timing one tooth and, if you wish to go to the trouble, the heel of the cam could be ground down to give greater valve lift. This would require great care and accuracy in machining, and should not be intrusted to an amateur machinist. An auxiliary oil pump should be fitted for supplying a small quantity of fresh oil to the crankcase at intervals; also lightweight pistons should be installed and the chassis should be lightened up throughout, wherever possible. Balancing should be given great attention, particularly to the connecting rods, pistons and crankshaft. With a larger carbureter, an auxiliary air cock could be placed in the inlet manifold for use at high speed, at which time it should be opened.

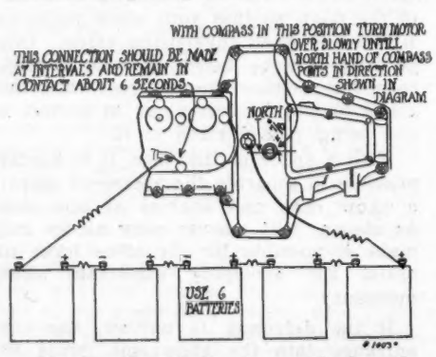

WITH COMPASS IN THIS POSITION TURN MOTOR OVER SLOWLY UNTIL NORTH HAND OF COMPASS POINTS IN DIRECTION SHOWN IN DIAGRAM
THIS CONNECTION SHOULD BE MADE AT INTERVALS AND REMAIN IN CONTACT ABOUT 6 SECONDS
NORTH
USE 6 BATTERIES

Fig. 2—Sketch showing method used to charge Ford magneto

PISTON PIN LOCATION

Q—Is there any advantage of having the piston pins offset in the pistons in the model D45 Buick? I intend to have this block reground, but am debating on putting the pins in the center or offsetting them as standard. Would this job give satisfaction if the pins were set in the center?—George R. Horton, the Auto Repair Shop, Sharpsville, Ind.

We would strongly advise against placing the piston pin holes in the center of the pistons. The holes are located in their present position by the Buick company to overcome the tendency of the rod to force the piston to one side of the cylinder wall. This construction prevents in a large degree the tendency toward piston slap, and only in the most extreme cases should pistons be installed which have not the piston pin hole offset.

TIMING AMCO ENGINE

Q—Advise the exact valve timing for an Amco engine such as the Paige little six uses. Also the number of pounds of compression of each cylinder.—D. W. Bedford, Beallsville, Pa.

The valve timing for the Amco engine is as follows: intake valve opens on top dead center and closes 30 deg. after bottom dead center; exhaust valve opens 25 deg. after bottom dead center, or 5/32 in., and closes 10 deg. after top dead center, or 3/64 in. The Paige has never used an Amco engine. The engine in the Paige is either a Rutenber or Continental.

PECULIAR ACTION OF HEADLIGHT

Q—Why is it that on a Packard 1-25 twin six the left hand headlight lights up and it is distinguished upon the application and release of the starter pedal? The entire electrical system is all right outside of the above phnomenon.—Walter S. Schultz, Rose City Garage, Madison, N. J.

The best we can do in this case is to offer a few suggestions for eliminating one thing after another until the trouble is located. The first thing to do is to trace the wire leading from the lamp by tapping it with a test light at various points along this wire, or with a meter you can determine just where the current is getting to this wire. Follow the path of this wire to its terminal on the switch, remove the wire from the terminal on the switch and depress the starter pedal, and note results. We are publishing a wiring diagram of this system for your guidance. It is shown in Fig. 3.

COMPASS BEST WAY TO DETERMINE POLARITY

Q—Some time ago we noticed in MOTOR AGE instruction for charging the Ford magneto with storage batteries without removing the magneto from the car. The directions were to set the flywheel with one of the brass screws one inch to the left of the magneto post and use two volts. We have tried this, and on a few cars had fine success, but on two cars we made the magneto worse instead of better. We would like to know if this is the proper procedure. It looks to us that we would be likely to get the wrong pole in place. What do you think is our trouble? We entirely killed one magneto that would run the ignition but would not furnish light.—Cecil E. Meeker, Hidalgo Garage, Hidalgo, Ill.

The proper method is to hold a compass near the magneto terminal, one inch to the left of the terminal and six inches to the rear; that is, the center line of the engine should be one inch to the right of the center line of the compass and the compass should be six inches behind the terminal plug. Turn the engine till the north seeking pole of the compass points directly to the front end of the car. This setting of the engine determines the success of the operation. Now disconnect the terminal wire from the magneto plug. Connect the positive battery terminal to the magneto plug and make several flash connections to the ground from the other battery terminal. Care must be taken that the compass does not reverse its polarity. If there is a shorted or a defective spool coil, the recharging current will sometimes entirely burn it out. This probably accounts for the poor results obtained on the two jobs referred to. The only thing to do in this case is to remove the engine from the car and either repair or replace the damaged coil.

RACING TYPE EXHAUST MANIFOLD

Q—Where can I secure an exhaust manifold and pipe that would fit the regular Ford and would come outside of the body?

2—Would 30 by 3 wheels and tires on all four wheels be practical?

3—Where can I secure a high dash board and hood to fit the regular Ford radiator?

4—Would it be practicable to cut off the driveshaft and housing and put full elliptic springs on the rear?—L. C. Hicht, the Service Garage, Amelia, Vt.

1—This will be answered by separate letter.

2—Regarding 30 by 3 tires, they would be practical only in straightaway racing and a smooth surface. For dirt track and regular touring we would recommend 30 by 3½ all around.

3—This will be answered by letter.

4—This is entirely a matter of choice. The change can be made, but whether it has any added advantages we are unable to state.

CRANKCASE DILUTION

Q—We have a 1916 Reo car that has been reground to .030 in. oversize, and fitted with new pistons and Gill rings. It has given considerable trouble with crankcase dilution. The engine pulls well and has good speed. The spark is strong and the compression good.—Chris Evensen, Chateau, Mont.

This trouble, no doubt, is due to poor vaporization of the long ends of the present-day poor fuel. An adequate means of hot-spotting is the best remedy for this condition. The names of replacement type hot-spot makers will be supplied you by letter.

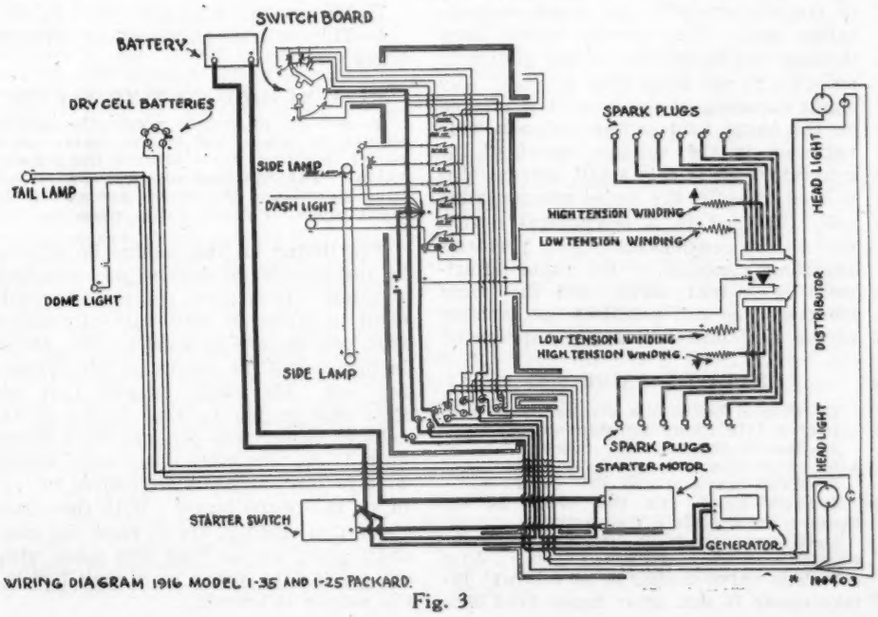


Fig. 3

DATA ON ARMATURE GROWLER

Q—How many turns and what size wire would be necessary to make a growler for testing generator armatures of the six-volt type, Auto-Lite, used on the Overland four? We have a 110-volt alternating current that we would like to hook up to.—Big Stone City Garage, Gerhardt & Kolb, Props., Big Stone City, S. D.

Directions for constructing a growler were published in the July 21 issue of MOTOR AGE. Three and one-half pounds of No. 22 wire would be about right for the windings. Experience has shown that home-made growlers cost on an average more than the purchase price of a new factory-made product, and we do not recommend their construction at home.

COMMUTATOR SHOULD BE TURNED ON LATHE

Q—I notice you say in turning down a commutator to turn it on its own bearings. I am slightly at a loss as to how to go about this. We have a lathe but I do not see how to hold it on its own bearings. Another thing I have noticed in some cars is that they will run from 10,000 to 20,000 miles and the rings will be almost worn to nothing and still they will not pump oil, and other cars will pump oil even after new leak-proof rings and new pistons are installed. I know that if new pistons and rings are installed correctly they will not pump oil, but what puzzles me is that some of the old cars never pump oil.—Fred A. Buess, F. W. Buess & Son Garage, Kempton, Ill.

It is about impossible to turn down a commutator on its own bearings. This is the ideal way, but it cannot be easily realized. The only way to turn down a commutator is to mount it between centers on a lathe. The fouling of oil can be attributed to many causes such as poor ignition, poorly designed gas distribution system and poorly designed combustion chamber. Crankcase dilution is accountable for much of the oil pumping today, and this is directly caused by the poor grade of fuel available. Oil pumping in many cars is eradicated by installing a hot-spot type of attachment for the manifold.

CHECKING CARBON ON FORD ENGINE

Q—Advise whether it would necessitate a change in the timing gears of the model T Ford engine after the valve ports have been reamed out so that the regular valve is ⅛ in. shorter after cutting off the end of the stem. The engine seems to run fairly well, but hasn't the compression that it had before the valves were reamed out. Shall I shift the large gear wheel back or forward a cog from punch marks in order to get proper timing?—S. F. Maxwell, McAlister, Okla.

The change described should not necessitate a change in the timing. The timing given here will enable you to check up and see whether you have the proper tappet clearance, which alone will affect the timing in the valves, providing the gear marks have been aligned. Intake opens .0625 after upper dead center and closes .5625 after lower dead center. Exhaust opens .3125 before bottom dead center. The tappet clearance should be .025 in.

ENGINE POSSESSES PECULIAR NOISE

Q—What is the cause of a 1919, 6-39 Scripps-Booth touring car equipped with a Zenith carbureter, DeLuxe pistons and Reco rings, having a whistling sound when the engine is running?

2—Why does this car use so much oil? It does not leak anywhere and does not pump oil. It uses about one quart in 50 miles, but does not smoke. Everything is tight all around.—Ralph P. Haan, care of H, & B. Garage, Detroit, Mich.

1—Certain models of the Zenith carbureter will whistle at certain engine speeds, mostly at the lower engine speed. This whistle is caused by the gas passing the low speed compensating hole at the edge of the carbureter butterfly throttle valve. It is also possible that some grease or dirt of some sort has gotten under the flywheel, which will cause a whistle. A leaking cylinder head gasket will squeak when the engine is running.

2—Regardless of what you say, there must be a leak some place in the engine or transmission that is causing this excessive oil consumption.

UNACCOUNTABLE KNOCK IN OVERHAULED ENGINE

Q—We overhauled a Buick model D-45, had the cylinders reground and new pistons fitted, with a clearance of .025; also new rings and wrist pins were put in, the connecting rods and pins were aligned, and the bearings taken up. We were very careful in breaking the engine in and watched it closely, but it has developed a knock at crankshaft speed which is more noticeable when the cutout is open. It is a dull knock similar to a main bearing, but is no worse on a pull than when idling. When the cutout is closed you can scarcely notice it until you reach a speed of about 25 m.p.h. Advise where it is or give me your opinion.

2—Publish internal wiring of the Westinghouse generator as used on the 1920 Dort.

3—Explain the action of the cutout on this system—D. C. Slick, The East Granite City Garage, Granite City, Ill.

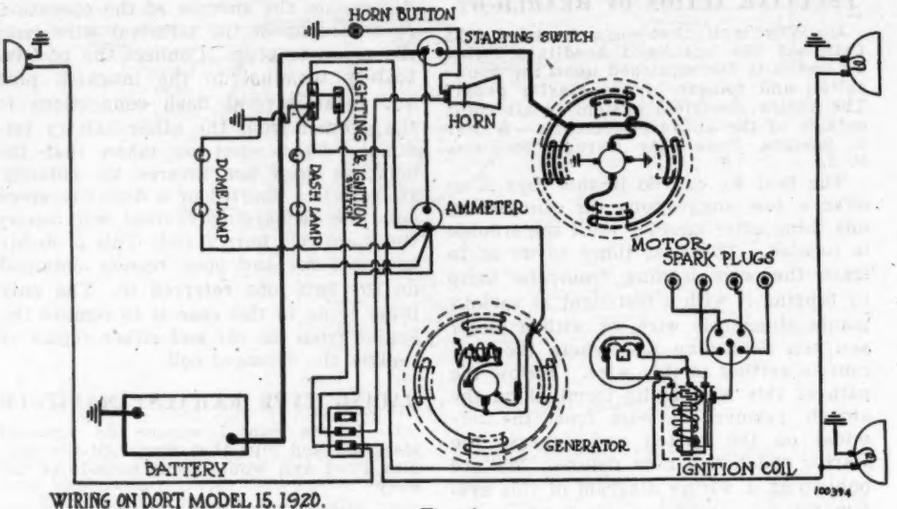
1—Judging from the description of this knock, we are tempted to render the opinion that it is an exhaust knock which is typical of most cars of this make. In tracing down knocks or trouble of any kind in an internal combustion engine it is well to start by a process of elimination. As the first step for this process we would suggest that you compare the running of this engine with a Buick which is considered in first class condition. You might also check over carefully all valves to see if they are sticking, as a sticking valve will cause quite an elusive knock.

2—The illustration of the Westinghouse generator internal connections is shown in Fig. 4.

3—The Westinghouse relay cutout differs from most cutouts in that it has a regulating resistor and a compensating series and shunt coil. These compensating coils are used to limit the amount of current. The action is as follows: when the speed of the generator is such that the voltage produced is slightly in excess of the battery voltage, the regulator shunt coil operates to close the cutout contact point, thus permitting the generator to charge the battery. The regulating contact points do not become operative until the generator voltage is in excess of the required amount. These points are generally set to commence regulation at about 15 to 18 amp.

When the voltage becomes excessively high, the series compensating coil begins to function. The flow of current through this coil causes the regulating contact to open, thus forcing the current to flow through the regulating resistor. The resistance of this coil is sufficient to cause the generator voltage to drop to a low value, when it is placed in series with the armature circuit. This is really a potential coil because it secures its flux from the voltage generated. If the regulation of the voltage were entirely dependent on the series coil, the regulation would be very poor. With the regulating resistor in series with the field of the generator, the drop in the voltage is considerable, and as soon as the regulating contracts close, the voltage rapidly rises.

This is comparatively a slow process and requires considerable time. To overcome this slow action the regulator is fitted with a shunt compensating coil in conjunction with the series compensating coil. The current which flows through the shunt field of the generator amounts to not more than ¼ amp. Any slight variation in the current impressed on the shunt field causes rather a wide variation in the voltage output of the generator. It is this small current that is used to assist the series compensating coil. Likened to a mechanical device, the series compensating coil performs the same function as the rapid adjustment of a feed screw, and the shunt compensating coil performs the function of the very fine micrometer adjustment.



WIRING ON DORT MODEL 15. 1920.

Fig. 4

DATA ON PAIGE 6-55

Q—Inform us of the proper valve timing of a 1919 Paige Larchmont.

2—Should timing take place with engine on center and spark fully retarded?

3—What speed should this car make?

4—How much can the speed be increased by a high lift camshaft?

5—Where can high lift camshafts be secured?—John F. Meyer, Laramie, Wyo.

1—The valve timing is as follows: intake opens 15 deg. after upper dead center and closes 50 deg. after lower dead center; exhaust opens 45 deg. before lower dead center and closes 10 deg. after upper dead center.

2—This probably refers to the spark timing. If so, the timing should be set 1¼ in. past upper dead center on the flywheel with the spark fully retarded.

3—65 m.p.h.

4—Probably 10 to 15 m.p.h. faster.

5—This must be made to order by some of the camshaft manufacturers, the names of which have been supplied you by letter.

MAXIMUM REVOLUTIONS OF VARIOUS ENGINES

Q—Advise us concerning the speed of a Saxon 1914, four-cylinder engine, when it is wide open.

2—An ordinary Ford engine.

3—A Moline Knight, 1916.

4—Can you supply back numbers of MOTOR AGE? I would like to obtain the write-ups of some of the automobile races held before the war, such as the 1915 Astor Cup race, Indianapolis races of 1912, 1913, 1914 and 1915, and of the Chicago Speedway races.—Wallis E. Worbois, North Chili, N. Y.

1—Approximately 2600 r.p.m.

2—2000 r.p.m.

3—1800 r.p.m.

4—This will be answered by separate letter.

EASY METHOD TO TIME VALVES

Q—Advise at what point the piston should be when the intake valve on a model 55 Buick starts to open the exhaust valve? The flywheel on this engine has been moved and the marks are not in the right place.—Pollock Bros., Olds, Ia.

The timing on this engine is supplied by the factory, in degrees of crankshaft rotation. To reduce degrees of crankshaft to inches of piston travel requires that two factors be known: the stroke in inches and the length of the connecting rod. We would suggest that you time this engine by the closing of the exhaust valve. The exhaust valve should open 11 degrees after upper dead center. This is approximately equivalent to 1/16 in. on the piston travel. With the piston set in this position, try to mesh the camshaft gear. If the gear will mesh without moving the piston more than 1-16 in., the setting is correct.

OVERHEAD VALVES

Q—Are there any other concerns besides the Laurel Co. that make valve heads for Dodge cars?—R. K. Wellman, 629 Mulberry street, Clinton, Ind.

We know of no concern making these heads, other than the one mentioned.

INFORMATION ON ROSS EIGHT

Q—Where can the following parts, such as ring gears, bearings and pinions for rear axle of Ross eight engine No. 1621 and model 75 be obtained?

2—What make of rear axle, front axle, gearset, bearings and clutch did they use?

3—Is it a common fault of ring gear and pinion to cause troubles?

4—What year was this model made?

6—Was it equipped with 35 by 4½ or 34 by 4 tires?

7—What speed was claimed for this model three-passenger roadster?—M. C. Engels, Campbellsport, Wis.

1—Parts for this car can be secured from the Great Western Auto Co., Kalamazoo, Mich.

2—The rear and front axles were manufactured by the American Gear Co., the transmission by the Grant Lees Co., the clutch by Borg & Beck.

3—No.

4—1917.

5—This is not available.

6—This car was equipped with 35 by 4½ tires.

7—This is not known.

REMOVING END PLAY

Q—Advise the easiest and quickest way to take up the end play in the crankshaft of the Ford engine. The Ford people make a washer to put on the crankshaft behind the gear, and oftentimes, when this is done, the timing gears are riding. In other words, they go into mesh too deep. The idea of the question is to make the Ford start easier.—N. D. Robinson, Robinson Motor Car Co., Columbus, Miss.

The washer method is the quickest way to eliminate this end play. For accurate results, however, the air gap between magnets and field should be set by means of a gage .015 to .018. This means that in some cases the thickness of the washer must be reduced to secure this setting. The permanent method is to install new bearing caps at center and rear.

NO PEP TO WILLYS-KNIGHT CAR

Q—We have a Willys-Knight which has been driven about 35,000 miles. We have installed new pistons and junk rings of standard make, but the engine has lost its power. The car has been driven about 1000 miles but still acts dead and has developed a knock in the engine. Timing is all right.

2—Would a Stromberg carbureter help this engine?—Fred Beach, care Beach & Son, Cambridge, O.

1—There are several causes that might contribute to the loss of power in this engine: poorly fitting piston rings and improperly fitted junk rings. It is barely possible that the junk rings have been fitted too tightly. To determine whether the loss of power is due to poorly fitted rings, it might be well to first check over the compression carefully since the installation of the rings. If the compression is fairly good the trouble may be due to other causes, such as a weak spark or improper carburetion. A positive way to determine the condition of the rings is to remove one of the pistons and note whether rings are bearing at all points. Also note whether they present a glossy, shiny appearance, which they should if they bear at all points.

2—If the original carbureter on this car is in good shape, it should give perfect satisfaction. When dismantling the Knight engine, do not remove the carbon or gummy oil from behind the junk rings, because this makes the sleeves gas tight.

STORING BATTERIES FOR WINTER

Q—Give the latest information for storing storage batteries for the winter.—Harry Hanson, Ismay, Mont.

Storage batteries may be stored either wet or dry. The battery which is to be put away for more than a year should be stored in dry storage. The battery which is to be out of commission for the winter only and is in general good shape can be stored by the wet method. In storing batteries by the wet method, before putting the batteries in storage give them a complete charge. Place the batteries on a bench or shelf in a convenient location and place each battery upon a strip in order to keep the bottom of the battery clear of the bench or shelf. Keep the battery terminals thoroughly covered with vaseline; also any cables that are burned onto these terminals. Once every month add distilled water to replace evaporation, then give batteries a new charge. This charge should be given once every month while the battery is in storage, and just before installing the battery in the car.

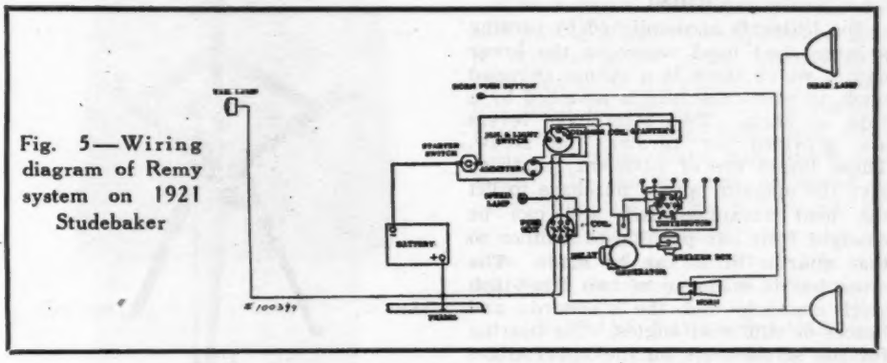


Fig. 5—Wiring diagram of Remy system on 1921 Studebaker

REGULATING GENERATOR OUTPUT

Q—The generator on a Studebaker light six, late 1920 or 1921 model, does not charge sufficient to keep the battery charged. Would you advise cutting off about two or three of the windings on the resistance coil? This car is equipped with a Remy generator.

2—Publish wiring diagram of this car.—Randolph Brunt, Rahway, N. J.

1—We would advise against tampering with the thermostatic control on the Remy generator. To secure a greater generator output, do so by regulating the third brush. When the adjustment has been made on the third brush, it is advisable to sand this brush in again to make perfect contact with the commutator.

2—The wiring diagram for this car is shown in Fig. 5.

CAUSES OF VALVES WARPING

Q—A contends that driving a car at a good speed for a mile or so, and then coasting with clutch in, will have a tendency to cause valves to warp, provided the cutout is open. B says that a cutout is better for an engine open than closed, if there is any difference. Give your advice.—C. E. Thompson, Grandfield, Okla.

We doubt whether A's contention will prove true in practice. He is working on a theory that rapid cooling of the valves will cause warping, and this is very true. But we doubt whether the car will cool off dangerously when coasting. One of the surest way to warp the valves in an engine is to start it out cold and to race it. Invariably the exhaust valves will warp if an engine is raced before the water and crankcase are warm. We do not believe that the cutout plays any great part in determining whether the valves will or will not warp. All things being equal, the cutout should be better for an engine when it is open than when closed. As before stated, A's theory is correct, but we doubt if his illustration will prove true in practice.

REMOVING COLE CLUTCH

Q—We have a Cole 30, serial No. 5779, and it runs very nicely idle, also pulling, except that it has a heavy thud, like a main bearing. We can feel the jar on the steering wheel and floor boards. All the bearings are tight. The noise seems to be at the rear of the engine. Could it be in the flywheel? If so, advise how to get the clutch out without removing the engine.—H. R. Harrison, Harrison Motor Car Co., West Salem, Ill.

It will be necessary to unbolt the flywheel and transmission case and remove them. First take down the driveshaft and the forward universal. Make some sort of a hoist to support the transmission case, preferably using a block and tackle to support it from above. This will prevent the case from falling when the housing screws are removed. Disconnect the clutch throwout collar and remove the entire transmission and housing assembly. It is probable that this is a loose flywheel. It would be well to try this engine on high test gasoline, if it is available, and note whether the knock is still present. If the high test gasoline eliminates the knock, it is a sure sign of fuel or compression knock. This can be cured only by lowering the compression and installing some replacement type of hot-spot to the intake manifold.

SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

MASSEY-HARRIS ONE-TON GARAGE HOIST

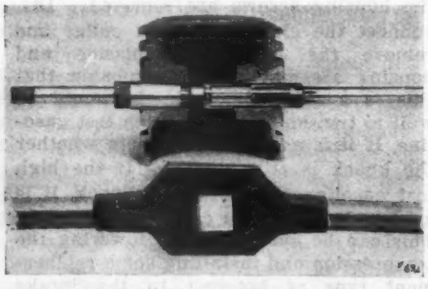
The lifting is accomplished by turning a large steel hand screw on the lower end of which there is a strong swiveled hook, to which the load is attached by a rope or chain. Two steel hand levers are provided for turning the screw. These levers are of sufficient length to give the operator ample purchase to lift the load advantageously and can be changed from one position to another so that quarter turns can be made. The cross bar is made up of two three-inch steel channels and the standards and braces of stiff steel angles. The bearing for the screw rests on the upper edges of the two channels which are placed just far enough apart to permit the screw to hang between them freely and can be readily moved from one side to the other should it be desired to use the screw in different positions on the bar. Price $25. Massey-Harris Harvester Co., Batavia, New York.

ALVORD ADJUSTABLE PISTON PIN AND WRIST PIN REAMER

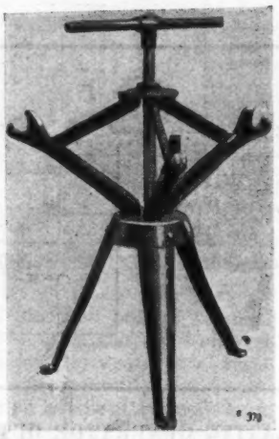
The illustration shows the operation of the Alvord piston pin and wrist pin reamer. This reamer has a pilot stem, both in front and rear, which is ground to an accurate sliding fit to the accompanying taper plug. The taper on the plug is very slight, but sufficient to align the reamer securely in place, and can be used for any size hole which the reamer will ream. No adjusting is necessary on the taper bushing. This reamer is made in four sizes. Alvord Reamer & Tool Co., Millersburg, Pa. This company also makes a solid type reamer wrench, as illustrated. It is a double end wrench and it is claimed to prevent chattering.

SMITH RIM PULLER

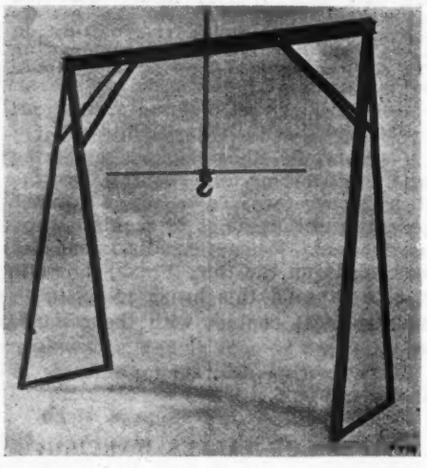
The cut illustrates the machine complete, showing the three swivel arms and the double feed screws which makes this machine rapid in operation and powerful. These arms or toggles, are loosely hinged in the jaws, allowing it to swing as the diameter of the rim becomes smaller as it is drawn in. Also by reversing the screw it will shove them apart, the arms swinging and allowing the rim to take its natural shape. J. B. Smith, Havana, Ill..



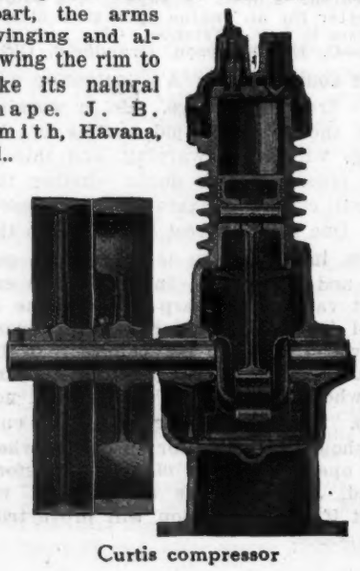
Alvord adjustable piston pin and wrist pin reamer



Smith rim puller



Massey-Harris one-ton garage hoist



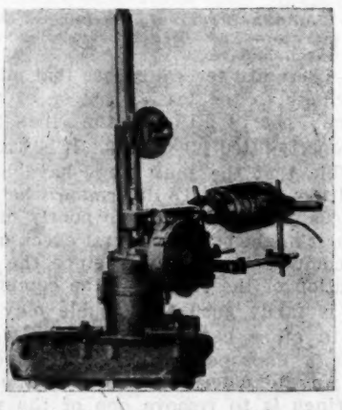
Curtis compressor

CURTIS COMPRESSOR

The cross section view shows the construction of a Curtis, model B compressor, indicating particularly the method of the controlled splash oiling system found in these compressors. Note the oil level in the crankcase. A high and low level filling gage is furnished which does not permit too much oil being put in and which shows by looking into the filler when it is necessary to refill the crankcase with oil. Neither the connecting rod nor the crankshaft dips into the oil, but on the crankshaft two knife-blade attachments dip down with each revolution of the flywheel, pick up a drop of oil as it passes through and throw it off onto the ribs cast on the upper half of the crankcase and also onto the little pin which is shown extending through the lower end of the cylinder wall. Just the right size pin is used so as to collect the proper amount of oil necessary to lubricate the cylinder of the compressor no matter how much is thrown on it. Curtis Pneumatic Machinery Co., St. Louis.

YORK BORING MACHINE WITH POWER ATTACHMENT

This is a portable machine tool for reboring cylinders and has an attachment which permits it to be operated by any electric drill of ⅜ in. capacity and up, or a ¼ hp. motor. It can also be operated by hand. Specifications follow: gear driven; two feeds, .020 and .050 in. per revolution; threadless boring bar; bearing surface, 18 in. long. Sectional base permits centering at any point in the cylinder; examining cut, taking a second cut, trying piston, etc., without disturbing centers originally found. Boring bar and cutter head can be raised or lowered mechanically in the cylinder at will. Cutter head has six non-chattering, self-centering, self-piloting cutters. Winterknight Equipment Co., Philadelphia, Pa.



York boring machine with power attachment

The ACCESSORY SHOW CASE

New Sources of Retail Profit

WINDSHIELD CLEANER WINDSHIELD VISOR

The specifications of the "Popular" windshield visor follow: electrically welded frame, double braced and covered with DuPont Fabricoid waterproof top material. Exposed metal parts heavily japanned. Prices, complete with clamps and screws ready for attaching, black fabric both sides, $6; black outside, green inside, $6.50.

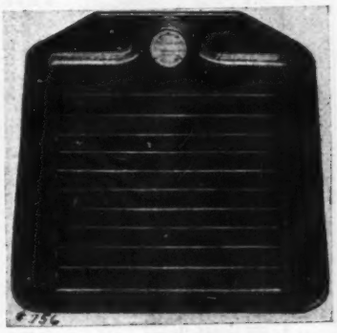
The windshield cleaner slides straight across the surface of the glass. A patented feature releases the pressure of the squeegee when not in use. Price complete, $2. Grigsby-Grunow-Hinds Co., 900 West Lake street, Chicago.

NEW COLLAPSIBLE RIM

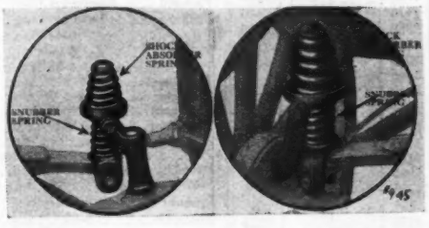
This rim has an automatic unlocking section which operates on a new principle. In the event of tire trouble, the motorist removes the tire and rim and gives them a sharp bounce on the road, which automatically releases the rim. When the tire is replaced, the rim is locked by a slight pressure of the foot against the unlocking section. The rim is made in all standard sizes. Collapsible Rim Corporation, Gotham National Bank building, Broadway at Columbus Circle, New York City .

SHOK AND SNUB DOUBLE DUTY ABSORBER FOR FORDS

This shock absorber is composed of two beehive springs, one to absorb the upward thrust of the wheels when passing over an obstruction and one to check the recoil. They are adaptable to any model Ford. It is claimed they can be installed in 45 minutes with the aid of a monkey wrench. Shok and Snub Sales Co., Peoria, Ill.



Winterfront automatic radiator shutter



Shok and Snub absorber for Fords

Elliott universal boxes

WINTERFRONT AUTOMATIC RADIATOR SHUTTER

This device is made for virtually all cars having a flat front radiator. A pair of Thermo-Wafer cells automatically open and close the shutters. The shutters open as the heat of the radiator rises above 130 deg. Fahr., and close when the temperature falls below that mark. The shutters may be closed by hand when the engine is stopped, but will open automatically when the engine is started again. Pines Mfg. Co., 408 North Sacramento blvd., Chicago.

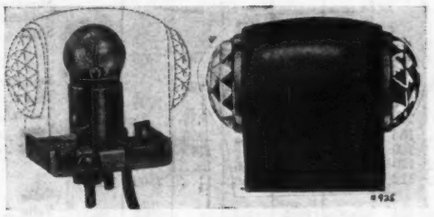
TIFFANY PARKING LAMP

The Tiffany parking lamp is attached to the fender with all mounting screws and connections concealed and fitting flush with the fender surface. The switch is accessible but concealed to prevent tampering by children. Bulbs can be replaced by removing the cover which leaves the lamp socket fully exposed. Standard two candlepower six to eight volt double contact bulbs are used. Black japan finish, $1.50; nickel finish, $1.75. Tiffany Mfg. Co., 50 Spring St., Newark, N. J.

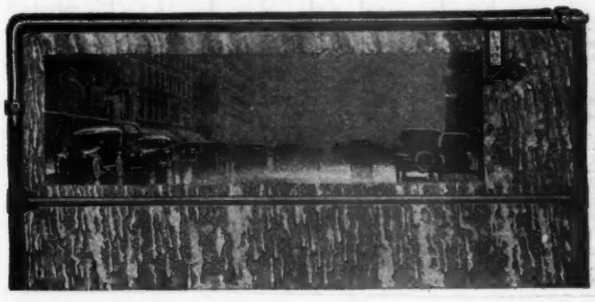
ELLIOTT UNIVERSAL BOXES

These boxes are made in three styles, one for tools, one for spark plugs and one for tubes. The Elliott boxes are made of 24 gage Welville steel and have no rivets or seams. They provide a safe clean compartment for tools and make it easy to find them when needed. The spark plug box will hold four spark plugs or two spark plugs and odds and ends such as light bulbs, fuses, cotter pins, tire valves, etc. The tube box protects them from the light and injury. Only Grease Gun Co., Jefferson, Ia.

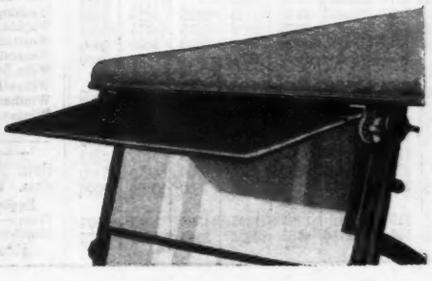
Bellevue bumper installed on a Dodge car. The one-piece construction, it is claimed, eliminates all possibility of rattle. Prices: Black enamel, $12.50; nickel plated, $12.50. Bellevue Mfg. Co., Bellevue, Ohio



Tiffany parking light



Popular windshield cleaner



Popular visor

New collapsible rim

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador R	Cont.	6-3⅝x5¼	136	33x5	....	†4500	$4500	....	$6500
American C	H-S.	6-3¼x5	127	32x4	$2195	2195	†2250	....	3150
Anderson Series 40	Cont.	6-3¼x4½	120	33x4	2195	1650	1795	$2450	2550
Apperson 8-21-S	Own.	8-3¼x5	130	34x4½	....	3000	3250	4500	4500
Auburn 6-51	Cont.	6-3¼x4½	121	32x4	1670	1695	1760	2475	2495
Auburn Beauty Six	Cont.	6-3¼x4½	121	32x4½	....	†2195	....	....	....
Beggs 28T	Cont.	6-3¼x4½	120	33x4	1775	1520	....	2320	2420
Bell 4-32	H-S.	4-3½x5	114	31x4	....	1495	....	....	....
Bell 6-50	H-S.	6-3¼x5	124	32x4	....	1695	....	....	....
Biddle B1 & B5	Buda.	4-3⅝x5½	121	32x4	3475	†3475	....	4350	....
Brewster 91	Own.	4-4 x5½	125	32x4½	†7000	7000	....	....	10500
Briscoe, 4-34	Own.	4-3⅝x5	109	31x4	1085	1085	....	1685	1685
Buick 1922-34-35-36-37	Own.	4-3⅜x4¾	109	31x4	895	935	....	1295	1395
Buick 1922-44-5-6-7	Own.	6-3⅜x4½	118	33x4§	1360	1395	....	1885	2065
Buick 1922-48-9-50	Own.	6-3⅜x4½	124	34x4½	....	....	1585	2075	2375
Cadillac 61	Own.	8-3½x5½	132	33x5	3100	3100	3150	3925	4100
Case X	Cont.	6-3¼x4½	122	32x4½	....	1890	....	....	2790
Chalmers 6-30	Own.	6-3¼x4½	117	32x4	1245	1295	....	1995	2295
Chalmers 6-30	Own.	6-3¼x4½	122	33x4½	....	....	1395	....	....
Champion Tourist	Lyc.	4-3½x5	113	32x3½	....	995	†995	....	....
Champion Special	H-S.	4-3½x5	118	32x4	†1195	1195	....	1785	2885
Chandler Six	Own.	6-3½x5	123	33x4	1785	....	....	2785	2885
Chevrolet 490	Own.	4-3⅛x4	102	30x3½	525	525	....	875	875
Chevrolet FB	Own.	4-3⅛x5¼	110	32x4	975	975	....	1575	1575
Cleveland 40	Own.	6-3 x4½	112	32x4	1295	1295	....	2195	2295
Climber Four K	H-S.	4-3½x5	115	33x4	1385	1385	....	....	....
Climber Six S	H-S.	6-3¼x5	125½	32x4½	2250	2250	....	3000	3100
Cole 890	Nort.	8-3½x4½	127¼	33x5	2485	†2485	2485	3385	3685
Columbia Challenger	Rut.	6-3½x5	115	32x4	....	1195	....	†1995	1995
Columbia D-C&CS	Cont.	6-3¼x4½	115	32x4	1475	1475	†1475	†2295	2350
Comet C-53	Cont.	6-3½x5¼	125	33x4½	....	2350	2450	....	3650
Commonwealth 44	H-S.	4-3½x6	117	32x4	....	1395	....	....	2465
Crawford 22-6-40	Cont.	6-3½x5½	122½	32x4	3000	3000	3000	....	4500
Crow-Elkhart L63-65	Lyc.	4-3½x5	117	32x3½	†1295	1295	....	....	....
Crow-Elkhart S63-65	H-S.	6-3¼x5	117	33x4	†1545	1545	....	....	2395
Daniels D-19	Own.	8-3½x5¼	132	34x4¼	†5350	†5350	5350	6250	6950
Davis 61-67	Cont.	6-3¼x4½	120	33x4½	†1895	1795	†2050	2595	2595
Dixie Flyer H-S-70	H-S.	4-3½x5	112	32x4	1195	1195	†1395	1895	1895
Dodge Brothers	Own.	4-3⅞x4½	114	32x4	935	985	....	1585	1785
Dorris 6-80	Own.	6-4 x5	132	33x5	....	†4785	4785	5800	7190
Dort 19-14	D-Ly.	4-3½x5	108	31x4	985	985	....	1535	1685
Driggs	Own.	4-2⅝x4½	104	30x3½	1275	1275	....	....	1975
Duesenberg Straight 8	Own.	8-2⅞x5	134	33x5	6500	6500	6750	7800	7800
Du Pont A	Own.	4-3⅛x5½	124	32x4½	3400	†3400	....	4500	4900
Durant A-22	Own.	4-3⅜x4¼	109	31x4	....	890	....	1365	1365
Durant B-22	Own	6-3¼x4½	123	32x4½	1600	1650	....	2250	2400
Earl 40	Own.	4-3⅞x5¼	112	32x4	1375	1285	....	....	1995
Elcar K-4	Lyc.	4-3½x5	117	33x4	†1145	1145	†1145	1545	1645
Elcar 7-R	Cont.	6-3¼x4½	117	33x4	†1595	1595	†1595	2395	2495
Elgin K-1	Falls.	6-3⅛x4¼	118	33x4	1595	1495	†1595	2395	2395
Essex	Own.	4-3½x5	108½	32x4	1095	1095	....	1345	1895
Falcon 4	Own.	4-3½x5	115	32x4	1295	1295	....	1990	2085
Falcon 6	Own.	6-3½x5	115	32x4	1595	1595	....	2295	2395
Falcon, H.P.M. 12-D22	Own.	4-2¾x4	100	27x3½	2800	†3000	....	....	4000
Fergus S-5-21	Own.	6-3½x5	126	33x4½	....	Chassi	s Price	85000	....
Ferris Series 69	Cont.	6-3½x5½	130	32x4½	2695	....	*2595	....	3695
Ferris Series 70	Cont.	6-3⅝x5¼	130	32x4½	2895	....	2795	....	3895
Ford T	Own.	4-3¾x4	100	30x3½	**325	††355	....	595	660
Franklin 9-B	Own	6-3¼x4	115	32x4	2300	2350	....	2650	3350
Gardner T-R & G	Lyc.	4-3½x5	112	32x3½	1095	1095	....	....	1695
Grant	Own.	6-3⅛x4½	116	32x4	1285	1285	....	1950	1950
H.C.S.	Weid.	4-3⅝x5½	120	32x4½	2725	†2775	....	3450	3650
Handley-Knight	Kn'ht.	4-4½x4½	125	32x4½	....	....	2450	3750	3750
Hanson Six 60	Cont.	6-3¼x4½	121	32x4	1595	1595	1795	†2475	2585
Hatfield A-42	H-S.	4-3½x5	115	32x4	†1495	1495	....	....	2395
Haynes 75	Own.	6-3½x5½	132	34x4½	2598	†2395	‡2395	....	3395
Haynes 55	Own.	6-3½x5	121	33x4	1645	1595	....	2295	2595
Haynes 48	Own.	†2-2¾x5	132	34x4½	4200	3635	3635	....	4950
Holmes Series 4	Own.	6-3½x4¼	126	34x4½	†2950	....	2950	3850	4150
Hudson Super 6	Own.	6-3½x5	126	34x4½	†1695	....	1745	2570	2570
Huffman R	Cont.	6-3¼x4½	120	32x4	1845	1795	....	....	2795
Hupmobile Series R	Own.	4-3½x5½	112	32x4	1250	1250	....	2100	2150
Jackson 638	Cont.	6-3¼x4½	121	32x4½	†2285	1635	....	2985	2985
Jordan MX	Own.	6-3⅞x4¾	120	32x4	2095	2095	....	3200	3200
Jordan F	Cont.	6-3½x5¼	127	32x4½	....	....	2475	....	3500
Kenworthy 8-90	Own.	8-3 x5¼	13[illegible]	32x4½	5000	5000	5250	6000	6000
Kessler K	Own.	4-3⅝x3¾	117	32x4	....	1995	....	....	2445
King 8 J	Own.	8-3 x5	120	32x4½	2140	†2125	*2125	3125	3235
Kissel 45	Own.	6-3⅞x5½	124	3.2x4½	2975	†2975	2475	†3775	*3775
Kline Kar 6-55-K	Cont.	6-3¼x4½	121	33x4	1890	1890	1890	3050	3090
Kurtz Automatic A	H-S.	6-3¼x5	122	32x4	....	2050	....	....	3000
LaFayette 134	Own.	8-3¼x5½	132	33x5	4850	4850	4850	6250	6500
Leach 999	Own.	6-3¾x5½	134	32x4½	6500	6500	6500	6500	6500
Lexington Series S	Anst.	6-3¼x4½	122	32x4	....	2100	....	....	2785
Lexington Series T	Anst.	6-3¼x4½	128	32x4½	....	....	2785	....	3750
Liberty 10-C	Own.	6-3½x5	117	32x4	1595	1595	†1675	2400	2495
Lincoln	Own.	8-3⅜x5	136	33x5	†4600	4300	4300	4950	5400
Locomobile 48	Own.	6-4½x5½	142	35x5	....	†7600	7600	10500	11000
Maibohm B	Falls.	6-3½x4¼	116	32x4	1395	1395	†1595	2295	2295
Marmon 34	Own.	6-3⅞x5½	136	32x4½	4185	†3985	3985	4875	5275
Maxwell Own.	Own.	4-3⅝x4½	109	31x4	$ 885	$ 885	....	$1385	$1485
McFarlan 1921	Own.	6-4½x6	140	33x5	6300	†6300	$6300	7500	7500
Mercer Series 5	Own.	4-3¾x6¾	132	32x4½	3950	†3950	*3950	4850	5250
Merit	Cont.	6-3¼x4½	119	32x4	†1985	1985	....	....	....
Meteor R & RR	Dues.	4-4½x6	129	32x4½	5500	5500	....	....	....
Mitchell F-50	Own.	6-3½x5	120	33x4	†1490	1490	†1790	2290	2440
Mitchell F-50	Own.	6-3½x5	127	33x4	....	....	1795	....	....
Monroe S-9 & 10	Own.	4-3¼x4½	115	32x3½	1295	1295	....	....	....
Monroe S-11 & 12	Own.	4-3¼x4½	115	33x4	....	....	....	2075	2175
Moon 6-48	Cont.	6-3¼x4½	122	32x4	1785	1785	2285	2785	2785
Moon 6-68	Cont.	6-3½x5¼	125	32x4½	....	....	2285	....	....
Murray-Mac Six	Own.	6-3½x5¼	128	34x4½	4250	4250	4250	....	....
Nash 681-7	Own.	6-3¼x5	121	33x4	1525	1545	†1605	2395	2695
Nash 682	Own.	6-3¼x5	127	34x4½	....	....	1695	....	....
Nash Four 41-4	Own.	4-3⅜x5	112	33x4	1025	1045	....	1645	1835
National Sextet BB	Own.	6-3½x5½	130	32x4½	2900	†2900	2900	4140	4240
Noma 3C	Cont.	6-3¼x4½	128	32x4½	2000	†2100	*2200	....	3200
Noma 1D	Cont.	6-3½x5¼	128	32x4½	3250	†3350	*3450	....	5500
Norwalk 430-KS	Lyc.	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland 34-D	Own.	6-2⅝x4¾	115	32x4	1005	1145	†1265	1625	1725
Ogren 6-T	Cont.	6-3½x5¼	134	33x5	†4250	4250	4375	5200	5500
Oldsmobile 43-A	Own.	4-3⅛x5¼	115	32x4	†1145	1145	....	1645	1795
Oldsmobile 37-A	Own.	6-2⅛x4¾	112	32x4	†1450	1450	....	2145	2145
Oldsmobile 46	Own.	8-2⅛x4½	122	33x4½	....	†1735	1735	....	2635
Oldsmobile 47	Own.	8-2⅞x4½	115	32x4	1595	†1595	....	2145	2295
Overland 4	Own.	4-3½x4	100	30x3½	595	595	....	850	895
Packard Single-Six	Own.	6-3⅜x4½	116	33x4½	2350	2350	....	3125	3350
Packard Twin Six	Own.	12-3 x5	136	35x5	4850	4850	4850	6600	6800
Paige 6-44	Own.	6-3½x5	119	32x4	1465	1465	....	1995	2245
Paige 6-66	Cont.	6-3⅝x5	131	33x4½	†2245	†2495	2195	3100	3155
Pan American 6-55	H-S.	6-3½x5	121	33x4	2000	2000	2100	....	....
Paterson 650	Cont.	6-3¾x4½	120	32x4½	....	1595	1625	2605	2695
Peerless 56-S-7	Own.	8-3¾x5	125	34x4½	....	†2880	2880	3500	3700
Piedmont 4-30	Lyc.	4-3½x5	116	32x3½	....	970	....	....	....
Piedmont 6-40	Cont.	6-3¾x4½	122	32x4	....	1285	....	....	....
Pierce-Arrow	Own.	6-4 x5½	138	33x5	7000	†6500	6500	8000	8500
Pilot 6-45	Tractor	6-3½x5	120	32x4	1945	1895	....	....	....
Pilot 65	Own.	6-3½x5	126	32x4½	2050	2000	2050	3000	2950
Porter 46	Own.	4-4 x6¾	142	35x5	6750	6750	6750	....	7800
Premier 6-D	Own.	6-3⅜x5½	126¾	33x5	3790	†3690	3890	4690	5190
Premocar 6-40 A	Falls.	6-3½x4¼	117	32x4	1295	1295	....	1945	1995
R & V Knight R	Own.	4-3¾x5	116	32x4	....	1850	....	2650	2750
R & V Knight J	Own.	6-3½x5½	127	32x4½	3350	†3350	3350	4000	4200
Reo Series B, T & U	Own.	6-3⅞x5	120	33x4	1650	....	1685	2700	2750
ReVere C	Dues.	4-4½x6	131	32x4½	4850	4650	†4650	....	6500
Roamer 6-54-E	Cont.	6-3½x5¼	128	32x4½	2750	†2485	2750	†3950	3950
Roamer 4-75-E	Dues.	4-4¼x6	128	32x4½	3850	3650	....	....	†4750
Rolls-Royce	Own.	6-4½x4¾	143½	33x5	U. S.	Chassi	s Price	11750	....
Romer R-22	Cont.	6-3¼x4½	120	33x4	1975	1975	2050	2400	2700
Saxon 125	Own.	4-3½x5	112	32x4	1195	1195	....	1795	1795
Sayers Six DP	Cont.	6-3¼x4½	118	33x4	1745	1745	....	2995	2995
Seneca L & O	LeR.	4-3¼x4½	108	30x3½	1045	1045	....	....	....
Southern Six 660-2	H-S.	6-3¼x5	127	32x4½	2375	2375	2395	....	....
Sperling, A	Supr.	4-3⅜x5	114	32x4	980	980	....	1685	1685
Standard J	Own.	8-3¼x5	127	34x4½	3400	†3400	3400	4500	4800
Stanley Steamer	Own.	2-4 x5	130	34x4½	2800	2600	2600	3775	3850
Stanwood Six	Cont.	6-3¼x4½	118	33x4	1765	1765	....	2750	....
Stearns SKL4	Own.	4-3¾x5⅝	125	34x4½	2250	2250	2450	3150	3450
Stephens 90	Own.	6-3¼x4½	122	33x4½	1800	†1850	*1850	2850	2850
Stevens-Duryea E	Own.	6-4⅞x5½	138	35x5	7250	†6900	6800	....	†8900
Studebaker EJ-40	Own.	6-3½x4½	112	32x4	1125	1150	....	1550	1850
Studebaker EH-50	Own.	6-3½x5	119	32x4	1585	1635	†1635	2450	2550
Studebaker EG-60	Own.	6-3⅞x5	126	33x4½	....	....	1985	2850	2950
Stutz	Own.	4-4½x6	130	32x4½	2950	†2990	*2990	3990	....
Templar A-445	Own.	4-3⅜x5½	118	32x4	1985	1985	....	2785	2785
Texan A-38	Lyc.	4-3½x5	115	33x4	1195	1195	....	....	....
Texan C-12	H-S.	4-3½x5	115	33x4	1350	1350	....	....	....
Tulsa E-1-2-3	H-S.	4-3½x5	117	33x4	1175	1175	....	....	....
Tulsa F-1	H-S.	6-3¼x5	119	33x4	1585	1585	....	....	....
Velie 48	Cont.	6-3¼x4½	115	32x4	1o85	1585	†1800	2485	2485
Velie 34	Falls.	6-3⅛x4½	112	32x3½	1235	1235	....	1750	2085
Vogue 6-55	H-S.	6-3¼x5	124	32x4	....	1885	1960	2785	2885
Vogue 6-66	Cont.	6-3½x5¼	124	33x4½	....	2085	2160	2885	2985
Waltham 6	Own.	6-3⅛x5	120	32x4	2350	....	2350	3050	3150
Washington	Cont.	6-3¼x4½	116	32x4	....	1785	....	....	....
Washington Jr.	Falls.	6-3⅛x4¼	116	32x4	....	1635	....	....	....
Westcott C-48	Cont.	6-3½x5¼	125	32x4½	....	2090	2090	....	3490
Westcott A-44	Cont.	6-3¼x4½	120	32x4	1800	1890	†1990	2800	2890
Wills Sainte Claire A-68	Own.	8-3¼x4	121	32x4½	2875	2875	....	3750	4100
Willys-Knight 20	Own.	4-3⅝x4½	118	33x4	1475	1525	....	2195	2395
Winther 61	H-S.	6-3½x5	120	32x4½	....	....	2250	....	....
Winton 25	Own.	6-3¾x5½	132	35x5	4600	†4075	4600	5050	†5050

*—6-passenger. †—4-passenger. ‡—3-passenger. **—Price without starter and demountable rims. Price with starter and demountable rims $420. ††—Price without starter and demountable rims. Price with starter and demountable rims $450.

Engine Make: Anst.—Ansted. Cont—Continental. Curt—Curtiss. D.Ly—Dort Lycoming Dues.—Duesenberg. H-S—Herschell-Spillman. LeR—Leroy. Lyc—Lycoming. Nort.—Northway. Roch—Rochester. Rut—Rutenberg. Weid—Weidely. Wisc—Wisconsin.

§Model 47—34 x 4½ Tires.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾	$1650§	3¼x5	34x5†	34x5†	W
Acason, R	1	2260	3¾x5¼	36x3½	36x5	W
Acason, RB	1½	2485	3¾x5¼	36x3½	36x6	W
Acason, H	2½	3295	4⅜x5¾	36x4*	36x8*	W
Acason, L	3½	4295	4⅜x5¾	36x5*	36x10*	W
Acason, M	5	5250	5 x6¼	36x6	40x12	W
Ace, C	1½	2295	3¾x5⅛	34x3½*	34x5*	W
Ace, A	2½	2795	4¼x5½	36x4*	36x7	W
Acme, G	¾	....	3¾x5	35x5†	35x5†	W
Acme, B	1	....	3¾x5	34x3½	34x5	W
Acme, F	1½	....	3¾x5	34x3½	34x5	W
Acme, A	2	....	4½x5¼	36x4	36x7	W
Acme, AC	2½	....	4½x5½	36x4	36x7*	W
Acme, C	3½	....	4½x5½	36x5	40x10	W
Acme, E	5	....	4¾x6	36x6	40x12	W
Akr'nMulti-Trk20	1½	1695	4 x5¼	34x5	34x5	B
American, 25	2½	3350	4 x6	33x4*	36x4d*	W
American, 40	4	4275	4½x6	36x5*	36x5d*	W
Apex, G	1	1450††	3½x5	33x5†	33x5†	I
Apex, D	1½	1915	3¾x5½	34x3½	34x4	I
Apex, E	2½	2695	4¼x5½	36x4	36x7	I
Anex, F	3½	3975	4½x6	36x5	36x10	I
Armleder, 20	1	....	3¾x5¼	34x3½*	34x5*	W
Armleder, HW	2½	....	4¼x5½	36x4*	36x7*	W
Armleder, KW	3½	....	4½x6	36x5	36x5d	W
Atco, B	1½	....	3¾x5¼	34x5†	36x6†	W
Atco, B1	1½	....	3¾x5¼	34x5†	36x6†	I
Atco, A	2½	....	4¼x5½	36x4†	36x8*	W
Atlas, M.D.	1	1185	3½x5	32x4½†	32x4½†	W
Atterbury, 20R	1½	2475	3¾x5	34x3½	34x5	W
Atterbury, 7CX	2½	3175	4½x5¼	36x4	36x4d	W
Atterbury, 7D	3½	3975	4½x5½	36x5	40x5d	W
Atterbury, 8E	5	4975	4¾x6	36x5	40x6d	W
Autocar, 21UF	1½-2	1950	4¾x4½	34x4*	34x5*	D
Autocar, 21UG	1½-2	2050	4¾x4½	34x4*	34x5*	D
Autocar, 26Y	5	3950	4¼x5½	34x6	36x12	D
Autocar, 26-B	5	4100	4¼x5½	34x6	36x12	D
Available, H1½	1½	2475	4 x5⅛	36x3½*	36x5*	W
Available, H2	2	2775	4 x5⅛	36x3½*	36x6*	W
Available, H2½	2½	3475	4 x5⅛	36x4*	36x8*	W
Available, H3½	3½	4475	4½x5½	36x5	40x5d	W
Available, H5	5	5375	4¾x6	36x6	40x12	W
Available, H7	7	6000	5 x6	36x6	40x14	B
Avery	1	....	3 x4	34x5†	34x5†	I
Beck, A Jr.	1	1950	3¾x5	34x3½	34x4	I
Beck, C	2	2550	4½x5½	36x4	36x6	I
Bell, M	1	1495	3⅝x5⅛	35x5	35x5†	W
Bell, E	1½	2100	3¼x5¼	34x3½	34x5	I
Bell, O	2½	2550	4½x5½	34x4	34x6	I
Belmont, D	2	2675	3¾x5	34x3½*	34x6*	D
Belmont, F	3½	3525	4 x6	36x5*	36x5d*	D
Bessemer, G	1	1395	3½x5	35x5†	35x5†	I
Bessemer, H-2	1½	1995	3¾x5	36x3½	36x5	I
Bessemer, J-2	2½	2595	4½x5¼	36x4	36x4d	I
Be semer, K-2	4	3495	4½x5½	36x5	36x10	I
Big 4, H	3½-4	5000	4½x6	36x6	36x6	W
Big 4, T	4	5500	4¾x6	36x6	36x6	W
Big 4, K	7	6000	5½x6	36x6	36x6	W
Big 4, HA	7	6000	4½x6	36x6	36x10	W
Brinton, C	1½	1500	3¾x5	34x4	34x5	W
Brinton, F	2½	2250	4⅝x5¼	36x4	36x7	W
Brockway, E	1	....	3¾x5	35x5†	35x5†	B
Brockway, S-4	1½	....	3¾x5	36x3½*	36x5*	W
Brockway, K-5	2½	....	4½x5½	36x4	36x8	W
Brockway, R-4	3½	....	4½x5½	36x5	36x5d	W
Brockway, T-4	5	....	4¾x6	36x6	40x6d	W
Capitol, G1½	1½	2975	3¾x5	35x5	38x7	W
Capitol, H2½	2½	3700	4¼x6	36x4	36x8	W
Capitol, K2½	2½	4250	4¼x6	36x6	42x9	W
Capitol, M3½	3½	4425	4¾x6	36x5	36x10	W
Case, ††	2	3000	4¼x5¾	36x6	38x7	I
Champion Light Commercial	½	1195	3½x5	32x3½	32x3½	I
Chevrolet, G	¾	745	3¼x4	31x4†	34x4½†	B
Chevrolet, T	1	1125	3¼x5¼	33x4†	35x5†	W
Chicago, C1½	1½	....	3¾x5½	36x3½*	36x5*	W
Chicago, C2½	2½	....	4 x5½	36x4*	36x7*	W
Chicago, C3½	3½	....	4½x5½	36x5	36x10	W
Chicago, D5	5	....	4½x5½	36x6	40x12	W
Climber, A-20	1½	2150	3½x5	36x6*	38x7*	I
Clydesdale, 18	¾	1890	3¾x5	34x5	34x5	W
Clydesdale, 32C	1	2375	3¾x5½	34x3½*	34x5*	W
Clydesdale, 42C	1½	2475	4 x5⅛	36x3½	36x5	W
Clydesdale, 65C	2½	3250	4¾x5½	36x4	36x7	W
Clydesdale, 65EC	2½	3150	4¾x5½	36x4	36x7	W
Clydesdale, 90C	3½	4100	4½x5½	36x5	40x10	W
Clydesdale, 120C	5	4500	4¾x6	36x6	40x12	W
Collier, 18	1	2350	3¾x5	34x4	34x5	W
Collier, 19	1½	2550	3¾x5	36x4	36x6	W
Collier, 21	2	2950	4½x5¼	36x4	36x7	W
Collier, 22	2½	3250	4½x5¼	36x4	36x4	W
Columbia, H	1½	2350	3¾x5	35x5†	34x5	I
Columbia, G	2½	2850	4 x5¼	36x4	36x7	I
Comet T	1½	1950	3¾x5	34x4	34x4	W
Commerce, T	¾-1½	1450	3¾x5	34x4½†	34x4½†	B
Commerce, 12	1½	1800	3¾x5	35x5†	35x5†	I
Commerce, 16	2	2150	3¾x5	35x5†	35x6†	I
Commerce, 18	2½	2495	4½x5¼	36x6†	36x7†	I
Concord, A	2	3150	4 x5½	36x3½	36x6	W
Concord, B	3	3600	4¼x5½	36x4	36x8	W
Concord, AX	2	3250	4 x5½	36x3½	36x6	W
Concord, BX	3	3600	4½x5½	36x4	36x8	W
Cook, 41	2	3000	4 x5½	36x6†	38x7†	I
Corbitt, H-22	1	$1480	3¾x5	34x3½	34x4	W
Corbitt, E-22	1½	2200	3¾x5	34x3½	34x4	W
Corbitt, C-22	2	2600	4¼x5¼	36x3½	36x6	W
Corbitt, B-22	2½	3000	4½x5¼	36x4	36x7	W
Corbitt, R-22	3	3200	4½x5½	36x4	30x8	W
Corbitt, A-22	3½-4	3800	4½x5½	36x5	36x10	W
Corbitt, AA-22	5	4500	4¾x6	30x6	40x6d	W
Day-Elder, A	1	1600	3¾x5	34x3½	34x4	W
Day-Elder, B	1½	2000	3¾x5	34x3½	34x5	W
Day-Elder, D	2	2400	4¼x5¼	36x4	36x7	W
Day-Elder, C	2½	2750	4½x5½	36x4	36x7	W
Day-Elder, F	3½	3150	4½x5½	36x5	36x5d	W
Day-Elder, E	5	4250	4¾x6	36x5*	40x6d*	W
Dearborn, E	1	1700	3¾x5¼	35x5†	35x5†	W
Dearborn, FX	1½	2300	3¾x5½	34x4	34x5	W
Dearborn, F	1½	2180	3¾x5½	34x4*	34x5*	W
Dearborn, 48	2	2590	3¾x5½	35x5†	34x7†	W
Defiance, G	1	1695§	3¾x5	35x5†	35x5†	I
Defiance, D	1½	2095§	3¾x5	35x5†	36x6†	I
Defiance, E	2	2275§	3¾x5	35x5†	38x7†	I
DeMartini, 1½	1½	2600	3¾x5	34x3½	34x6	W
DeMartini, 2	2	3300	4 x5½	36x3½	36x7	W
DeMartini 3	3	4250	4¼x5½	36x4	36x10	W
DeMartini 4	4	4800	4½x6	36x5	36x12	W
Denby, 31	¾	1485	3½x5	35x5	35x5	B
Denby, 33	1½	2145	3¾x5	35x5†	38x7†	I
Denby, 34	2	2395	3¾x5	36x3½	36x6	I
Denby, 25	3	3300	4½x5¼	36x4	36x7	I
Denby, 27	4	3895	4½x5½	36x5	36x5d	I
Denby, 210	5	4295	4½x5½	36x6	40x6d	I
Dependable, A	¾-1	1650	3¾x5½	34x5	36x6	W
Dependable, C	1½	2350	3¾x5¼	34x3½	34x5	W
Dependable, D	2	2650	4 x5½	34x5	36x6	W
Dependable, E	2½	2950	4¼x5½	36x4	36x7	W
Dependable, G	3½	3550	4½x6	36x6	38x7	W
Diamond T, O	1-1¼	1975	3¾x5¼	36x3½†	36x4†	W
Diamond T, FS	1½	2525	3¾x5¼	36x3½	36x5	W
Diamond T, T	1½	2250	3¾x5¼	36x3½	36x5	W
Diamond T, U	2	2650	4 x5¼	36x4	36x7	W
Diamond T, K	3½	3750	4¼x5½	36x5	36x5d	W
Diamond T, EL	5	4325	4½x5½	36x6	40x6d	W
Diamond T, S	5	4500	4¾x6	36x6	40x6d	W
Diehl, A	1	....	3½x5	34x4½	35x5	I
Diehl, B	1½	....	3½x5	36x6	36x6	I
Dispatch, F	1	1350	3¾x5	34x4†	34x4†	I
Doane	2½	4100††	4¼x5¾	36x5	36x7	C
Doane	3½	5100††	4¾x5¾	36x5	36x5d	C
Doane	6	6000††	5 x6½	36x6	40x6d	C
Dodge Brothers	½	885	3⅞x4¾	32x4†	32x4†	B
Dorris, K-4	2-2½	3400	4¼x5½	36x4	36x7	W
Dorris, K-7	3½	4400	4¼x5½	36x5	36x10	W
Dort, 103	½	685	3½x5	31x4	31x4	B
Double Drive B	3	4000	4¼x5½	6	6	W
Douglas G	1½	1850	3¾x5⅛	36x5	37x8*	W
Douglas I	3	2950	4¼x5½	36x6	37x8*	W
Duplex, A	1½	2775	4 x5¼	35x5†	38x7†	W
Duplex, E	3½	4250	4¼x5½	36x8	36x8	I
Duty, 21	2	1490	3½x5	34x3½	34x5	I
Eagle, 100-2	2	2275	3¾x5¼	34x4*	34x7*	I
Erie, E	1½	....	3¾x5¼	36x6†	36x6†	W
Erie, A	2½	....	4¼x5½	36x4	36x4d	W
F.W.D., B	3	4200	4¾x5½	36x6	36x6	B
Facto, 1921	2½	2295§	4¼x5½	36x4*	36x8*	W
Fageol, 1½	1½	3000	3¾x5¼	34x3½*	34x6*	W
Fageol, 2½	2½	3900	4¼x5¾	34x4	36x7	W
Fageol, 3½	3½	5000	4½x6¼	36x5*	40x5d*	W
Fageol, 5	5	5700	4½x6¼	36x6	40x6d	W
Fargo, R	2	1900	3¾x5	36x4	36x6	I
Federal, SD	1½	1800	3¾x5	35x5†	36x6†	W
Federal, TE	1½	2175	4¼x5¼	36x3½	36x5	W
Federal, UE	2	2425	4¼x5¼	36x4	36x7	W
Federal, WE	3½	3150	4½x5½	36x5	36x5d	W
Federal, X2	5-6	4550	4¾x6	36x6	40x6d	W
Ford, TT	1	445	3¾x4	30x3½*	32x4½*	W
Forschler, A	1	....	3½x5	34x3	34x4	W
Forschler, AX	1½	....	3½x5	36x3½	36x5	W
Forschler, B	2	....	4¼x5¼	36x4	36x7	W
Forschler, BX	3	....	4½x5¼	36x4	36x8	W
Front Drive C	1½	2800	3¾x5½	5	4	W
G & J** 20	1	2450	3⅝x5¼	34x5†	34x5†	W
G & J** A	2	3850	4x5¼	36x4	36x7	W
G & J** B	3½	5175	4½x5¼	36x5	36x5d	W
G.M.C., K16	1	1495	3½x5½	34x5†	34x5†	B
G.M.C., K41 A	2	3000	4 x5½	36x4*	36x7*	W
G.M.C., K71 A	3½	4250	4½x6	36x5	40x5d	W
G.M.C., K101A	5	4650	4½x6	36x5	40x6d	W
G.W.W.	1½	1950	3¾x5½	35x5	35x5	I
Garford, 15	¾	1590	3⅝x5½	34x5†	34x5†	W
Garford, 25	1¼	1990	3¾x5½	36x3½	36x4	W
Garford, 70-H	2	2750	4¼x5½	36x4	36x7	W
Garford, 77D	3½	$4300	4½x6	36x5	36x6d	W
Garford, 68D	5	5200	5 x6½	36x6	40x6d	W
Garford, 150-A	7½	5500	5x6½	36x6	40x7d	C
Gary, F	1	2100	3¾x5	36x3½	36x4	W
Gary, I	1½	2550	4 x5½	36x3½	36x5	W
Gary, J	2½	3150	4½x5½	36x4	36x7	W
Gary, K	3½	4050	4½x6	36x5	40x5d	W
Gary, M	5	5150	5 x6½	36x6	40x6d	W
Gersix, M	1½	3100	4 x5½	36x3½	36x7	W
Gersix, K	2½	3500	4½x5½	36x4	36x8	W
Gersix	3½	4500	4½x6	36x5	40x12	W
Golden West, GH	3	4500	4½x6	36x7	36x7	W
Golden West, G	3½	5000	4½x5½	36x6	36x6	W
Graham Bros. 1-Ton	1	1370	3⅞x4½	36x4½	34x5	B
Graham Bros. A	1½	1420	3⅞x4½	32x4½†	36x6†	B
Gramm-Bern., 10	1	1365§	3½x5	33x5†	33x5†	F
Gramm-Bern., 15	1½	2050§	3¾x5	36x3½*	36x5*	I
Gramm-Bern., 65	1½	2725§	3¾x5	36x3½*	36x5	W
Gramm-Bern., 20	2	3175§	4¼x5¼	36x4*	36x7*	W
Gramm-Bern., 25	2½	3575§	4¼x5½	36x4*	36x4d*	W
Gramm-Bern., 35	3½	4375§	4½x5½	36x5	40x5d*	W
Gramm-Bern., 50	5	5275§	4¾x6	36x6	40x6d*	W
Hahn, J4	1	....	3¾x5	34x5*	34x5*	W
Hahn, CD	1½	....	4½x5½	36x3½*	36x6*	W
Hahn, EE	2½	....	4½x5½	36x4*	36x8*	W
Hahn, F	3½	....	4½x5½	36x5*	36x10*	W
Hahn, EF	5	....	4¾x6	36x6	40x12	W
Hal-Fur, E	1½	2350	4 x5½	34x5†	38x7†	W
Hal-Fur, B	2½	3000	4½x5½	35x5*	38x7*	W
Hal-Fur, F	3½	4000	4½x5½	36x6†	40x10†	W
Hall, 1½	1½	3100	3¾x5	34x5†	38x7†	W
Hall, 2½	2½	3275	4½x5¼	36x4	36x6	W
Hall, 3½	3½	4100	4½x5½	36x5	36x5d	W
Hall, 5	5	5100	4½x5½	36x5	40x6d	W
Hall, 7 chain	7	5100	4½x5½	36x5	40x6d	C
Harvey, WEA	1½	2550	4½x5½	34x3½	34x5	W
Harvey, WOA	2	2950	4½x5½	34x4	34x7	W
Harvey, WFA	2½	3300	4½x5½	36x4	36x7	W
Harvey, WHA	3½	3950	4½x6	36x5	36x5d	W
Harvey, WKA	5	4500	4½x6	36x6	40x6d	W
Hawkeye, K	1½	1850	3¾x5¼	34x3½*	34x5*	I
Hawkeye, M	2	2650	4¼x5½	36x4*	36x6*	I
Hawkeye, N	3½	3700	4½x6	36x5*	36x10*	I
Hendrickson, N	2½	3150	4¼x5¾	36x4*	36x7*	W
Hendrickson, M	3½	3975	4¼x5¾	36x5*	36x5d*	W
Huffman, B	1½	1995	3¾x5	34x3½	34x6	W
Huffman, C	1½	1795	3¾x5¼	34x3½	34x6	I
Hurlburt A	1½	2850	4 x5½	34x4	34x5	W
Hurlburt B	2½	3750	4¼x5½	36x4	36x4d	W
Hurlburt C	3½	4500	4½x6	36x5	36x5d	W
Hurlburt D	5	5500	4½x6	36x5	40x6d	W
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	W
Indep'd't(Iowa), G	1½	2040	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.), H.I	2½	2940	4¼x5¼	34x4	34x6	I
Indep d't(Ohio), F	1½	2385	3¾x5	36x3½	36x5	W
Indep'd't(Ohio), H	2½	3085	4¼x5¼	36x4	36x4d	W
Indep'd't(Ohio), K	3½	3985	4½x5½	36x5	36x5d	W
Indiana, 12	1½	....	3¾x5¼	34x3½*	34x5*	W
Indiana, 20	2	....	4¼x5½	36x4*	36x7*	W
Indiana, 25	2½	....	4¼x5½	36x4*	36x8*	W
Indiana, 35	3½	....	4¾x5½	36x5*	36x5d*	W
Indiana, 51	5	....	5 x6¼	36x5*	40x6d*	W
Inland, D	2	2950	4 x5	34x5	34x6	I
International, S	¾	1500	3½x5	34x5†	34x5†	I
International, 21	1	1750	3½x5¼	36x3½	36x3½	I
International, 31	1½	1850	3½x5¼	36x3½	36x4	I
International, 41	2	2100	3½x5¼	36x3½	36x5	I
International, 61	3	2400	4½x5	36x4	36x6	I
International, 101	5	3600	4½x5	36x5	40x10	I
J & J, D	2	3250	4 x5	34x4*	34x6	I
Jackson, 4WD	3½	3850	4½x5½	36x7	36x7	B
Jumbo, 15	1½	2425	3¾x5¼	36x3½	36x5	I
Jumbo, 20	2	2675	3¾x5¼	35x5†	38x7†	I
Jumbo, 25	2½	3090	4½x5½	36x4	36x7	I
Jumbo, 30	3	3590	4¼x5½	36x6†	42x9†	I
Jumbo, 35	3½	4080	4½x6	36x5	36x10†	I
Jumbo, 40	4	4730	4½x6	38x7†	44x10	I
K-Z, 1	1	1750	3½x5	34x3½	34x5	W
K-Z, 1½	1½	2075	3¾x5	36x4	36x6	W
K-Z, 2½	2½	2550	4¼x5¼	36x4	36x8	W
K-Z, 3½	3½	3350	4½x5½	36x5	40x10	W
K-Z, 5	5	3850	4½x5½	36x6	40x6d	W
Kalamazoo, G-1	1½	2495	3¾x5	34x4	34x5	W
Kalamazoo, G-2	1½	2800§	3¾x5	36x5	36x6	W
Kalamazoo, H	2½	3275§	4 x6	36x4	36x8	W
Kalamazoo, K	3½	4000§	4½x6	36x5	36x10	W
Kalamazoo K-5	5	4500§	4½x6	36x6	36x6d	W
Karavan, A	2½	3900	4½x6	36x4	36x8	W
Kearns, H	1	1600	3¼x4½	32x4½†	32x4½†	I
Kearns, N	2	2200	3½x5	34x3½	34x6	I
[1]Kelly-S., K-31	1½	2900	3¾x5¼	36x3½	36x6	C
[1]Kelly-S., K-34	1½	2900	3¾x5¼	36x3½	38x6	W
[1]Kelly-S., K-38	2½	3250	3¾x5¼	36x4	36x4d	W
[1]Kelly-S., K-35	2½	3250	3¾x5¼	36x4	36x4d	C
[1]Kelly-S., K-40	3½	4200	4¼x6½	36x5	40x5d	C
[1]Kelly-S., K-41	3½	4200	4½x6½	36x5	40x5d	I
[1]Kelly-S., K-42	3½	4200	4½x6½	36x5	40x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

1—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
[1]Kelly-S., K-45	4	$4550	4½x6½	36x5	40x6d	C
[1]Kelly-S., K-50	5	4900	4½x6½	36x6	40x6d	C
[1]Kelly-S., K-60	6	5100	4½x6½	36x6	40x7d	C
Keystone, 40	2	2450	3⅝x5⅛	34x5†	38x7†	I
Kimball, AB	2	3675	4 x6	36x4	36x7	W
Kimball, AC	2½	3975	4½x6	36x4	36x8	W
Kimball, AK	3	4500	4½x6	36x4	36x10	W
Kimball, AE	4	5000	4¾x6	36x5	40x12	W
Kimball, AF	5	5830	5 x6	36x6	40x7d	W
Kissel, Express	1	1935†‖	3½x5½	34x5†	34x5†	W
Kissel, Utility	1½	1975	3½x5½	36x3½	36x5	W
Kissel, Freighter	2½	2875	4¼x5½	36x4	36x7	W
Kissel, H. D.	4	3675	4¼x5½	36x5	36x5d	W
Kleiber, AA	1	2600	4½x5¼	34x3½*	34x5*	W
Kleiber, A	1½	3100	4½x5¼	36x3½*	36x6*	W
Kleiber, BB	2	3600	4½x5¼	36x4*	36x7*	W
Kleiber, B	2½	3950	4½x5½	36x5*	36x8	W
Kleiber, C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber, D	5	5300	5 x6½	36x6	40x12	W
Koehler, D	1½	1995	3½x5	34x3½	34x5	W
Koehler, M	2½	3175	4 x5½	36x4	36x7	W
Koehler, MCS	2½	3275	4 x5½	36x4	36x7	W
Koehler, F	3½	4150	4½x5½	36x5	36x10	W
Koehler, MT, Trac	5	3275	4 x5½	36x4	36x7	W
Lange, B	2½	3350	4½x5¼	36x4*	36x7*	C
Larrabee, X-Z	1	1925	3¼x4½	34x5†	34x5†	B
Larrabee, U	1½	2100	3¾x5	34x3½	34x5	W
Larrabee, K	2½	3200	4½x5¼	36x4	36x7	W
Larrabee, L-4	3½	4000	4½x5½	36x5	36x5d	W
Larrabee, W	5	4800	4¾x6	36x6	40x6d	W
Luedinghaus, C	1	1605	3½x5	35x5†	35x5†	W
Luedinghaus, W	1½	2490	3¾x5¼	34x3½*	34x5*	W
Luedinghaus, K	2–2½	3150	4½x5¾	36x4*	36x7*	W
Maccar, L	1½	2700	4½x5¼	36x4	36x6	W
Maccar, H-A	2	3100	4½x5¼	36x4	36x4d	W
Maccar, H-2	3	3400	4½x5½	36x4	36x4d	W
Maccar, M-2	4	4200	4½x6	36x5	36x5d	W
Maccar, G	5–6	4950	4¾x6	36x5	40x6d	W
MacDonald, A	7½	5750	5½x6	40x7	40x14	I
Mack, AB D.R.	1½	3150	4 x5	36x4	36x3½d	D
Mack, AB	2½	3100	4 x5	36x4	36x4d	C
Mack, AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack, AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack, AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack, AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack, AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack, AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack, AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac, AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac., AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac. AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac., AC	13	5750	5 x6	36x6	40x12	C
Mack Trac., AC	15	6000	5 x6	36x7	40x7d	C
Mapleleaf, AA**	2	4150	4 x5¼	36x4	36x7	W
Mapleleaf, BB**	3	4775	4¼x5½	36x4	36x4d	W
Mapleleaf, CC**	4	5770	4½x5½	36x5	36x5d	W
Mapleleaf, DD**	5	6490	4½x5½	36x6	40x6d	W
Master, JW	1½	2690	4½x5½	34x3½	34x5	W
Master, W	2½	3290	4¼x5½	34x4	36x7	W
Master, D	2½	3510	4¼x5½	34x4	36x7	D
Master, A	3½	4190	4½x6	36x5	40x5d	W
Master, E	3½	4640	4½x6	36x5	40x5d	D
Master, B	5	5290	4¾x6½	36x6	40x6d	W
Master, F	5	5140	4¾x6½	36x6	40x6d	D
Master Trac., T	6	3740	4¼x5½	34x4	36x7	D
Maxwell, 1½	1½	932	3⅝x4¼	32x3	32x4	W
Menominee, HT	1	2080	3¾x5	34x3½	36x5	W
Menominee, H	1½	2725	4 x5	36x3½	36x5	W
Menominee, D	2	3245	4 x6	36x4	36x8	W
Menominee, G	3½	4270	4½x6	36x5	36x10	W
Menominee, J-3	5	5150	4¾x6	36x6	40x12	W
Moline, 10	1½	1985	3½x5	34x5†	36x6†	I
Moreland, 21B	1½	2800	4½x5¼	36x3½	36x6	W
Moreland, 21C	2½	3500	4½x5½	36x4	36x8	W
Moreland, 21H	3½	4600	4¾x6	36x5	40x5d	W
Moreland, 21J	5	5000	4¾x6	36x6	40x6d	W
Napoleon, 7	¾	1350	3½x5	38x4	33x4†	I
Napoleon, 9	1	1535	3½x5	35x5*	35x5*	I
Napoleon, 11	1½	1860	3½x5	35x5*	36x6*	I
Nash, 2018	1	1895	3¾x5¼	35x5	36x6	I
Nash, 3018	2	2550	3¾x5¼	36x6	40x8	I
Nash, Quad.	2	3250	4¼x5½	40x8	40x8	I
Nash, 5018	2½	2550	3¾x5¼	34x4	34x6	I
[2]Nelson, F1½	1½	....	4½x5¼	36x3½	36x5	W
[2]Nelson, F2	2	....	4½x5¼	36x4	36x7	W
[2]Nelson, F3½	3½	....	4½x5½	36x5	36x5d	W
[2]Nelson, FCS	5	....	4¾x6	36x6	40x6d	W
Netco, D	2	3100	4½x5¼	36x4*	36x7*	W
Netco, H	2½	3500	4½x5½	36x4*	36x8*	W
New York, M	1½	....	4½x5¼	36x3½	36x5	W
New York, N	2–2½	....	4½x5¼	36x4	36x4d	W
Niles, E	2	3000	4½x5¼	36x4*	36x7*	W
Noble, B30	1½	2100	3¾x5¼	36x3½	36x5	W
Noble, C40	2	2675	4 x5½	36x4	36x7	W
Noble, D50	2½	2950	4¼x5½	36x4	36x8	W
Noble, E70	3½	3900	4½x6	36x5	36x10	W
Northway, B-2	2	3400	4 x6	36x4	36x4d	W
Northway, B-3	3½	4400	4 x6	36x5	40x5d	W
NorthwesternW	1½	2700	4½x5¼	34x4	36x6	W
Northwestern WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk, 25E	1	1695	3½x5	34x3½	34x4	W
Norwalk, 35E	1½	2025	3½x5	34x3½	34x3½d	W
Norwalk, 35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
O. K., K1	1½	$2675	4 x5½	36x3½	36x5	W
O. K., L1	2½	3450	4¼x5½	36x4	36x8	W
O. K., M1	3½	4250	4½x6	36x5	36x5d	W
Ogden, A1	1½	2375	3¾x5	36x3½	36x5	W
Ogden, E	2½	2975	4¼x5¼	36x4	36x7	W
Old Hickory, W	1	2175	3¾x5	36x3½*	36x4*	W
Old Reliable, A	1½	2350	4 x5	34x4	36x6	W
Old Reliable, B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable, C	3½	4250	4¼x6	36x5	36x5d	W
Old Reliable, D	5	5250	4¾x6	36x6	40x6d	W
OldReliable,KLM	7	6000	4¾x6¼	36x6	40x7d	C
Oldsmobile Econ.	1	1095	3½x5¼	35x5†	35x5†	I
Olympic, A	2½	3500	4¼x5½	36x4	36x7	W
Oshkosh, A	2	3750	3½x5.	36x6†	36x6†	4
Oshkosh, AA.	2	3850	3½xb	36x6†	36x6†	4
Oshkosh, B	2½	4150	4 x5½	38x7†	38x7†	4
Oshkosh, BB	2½	4300	4 x5½	38x7†	38x7†	4
Packard, EC	1½–3	3500	4½x5½	36x4	36x7	W
Packard, EX	1½–3	4000	4½x5½	36x6†	40x8†	W
Packard, ED	2–4½	4100	4½x5½	36x5	36x5d	W
Packard, EF	4–7½	4500	5 x5½	36x6	40x6d	W
Paige, 52–19	1½	2880	4 x5¼	34x3½	34x5	W
Paige, 54–20	2½	3400	4¼x5½	34x4	34x8	W
Paige, 51–18	3½	4285	4½x5½	36x5	36x5d	W
Parker, FZ0	2	3500	4 x6	34x4	36x4d	W
Parker, J20	3½	4400	4½x6	36x5	40x5d	W
Parker, M20	5	5500	4¾x6	36x6	40x6d	W
Patriot, Revere	1	1500	3¾x5	35x5†	35x5†	W
Patriot, Lincoln	2	2050	4 5¼	34x3½	34x5	W
Patriot, Washgt'n	3	2900	4½x5½	36x4	36x7	W
Piedmont, 4–30	1	1200	3½x5	34x4†	34x4†	W
Pierce-Arrow	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow	5	4850	4½x6¾	36x5	40x6d	W
Pioneer, 59	1	1550	3¾x4¼	32x4½†	32x4½†	W
Pittsburger, C-21	3	3800	4½x5¼	36x5*	36x7*	W
Power, F	2	3400	3¾x5¼	36x6	36x6	W
Power, C	3½	4500	4¼x5½	36x5	40x10	W
Premocar, B-143	1½	2475	3½x5	36x6†	36x6†	W
Rainier, R-21	¾	1990	3½x5	35x5†	35x5†	W
Rainier, R-19	1	2150	3½x5	34x3½	31x4	W
Rainier, R-16	1½	2490	3¾x5	34x3½	34x5	W
Rainier, R-18	2	2890	4½x5¼	34x4	34x6	W
Rainier, R-20	2½	3550	4½x5¼	34x4	34x7	W
Rainier, R-15	3½	4400	4½x5½	36x5	36x5d	W
Rainier, R-17	5	5100	4½x6	36x6	36x6d	W
Ranger, TK-22-2	2	2775	3¾x5	36x6†	38x7†	W
Reo, F	¾–1‖	1245	4½x4½	34x4½†	34x4½†	B
Reliance, 10A	1½	2400	4 x5½	36x3½	36x5	1
Reliance, 20B	2½	3100	4¼x5½	36x4	36x4d	1
Republic, 75	¾	1395†‖	3½x5	32x4½	32x4½	1
Republic, 10	1	1395	3¾x5	35x5†	35x5†	1
Republic,10Exp.	1	1695	3¾x5	35x5†	35x5†	1
Republic, 11X	1½	1795	3¾x5	34x3½	34x5	1
Republic, 19	2½	2155	4½x5¼	36x4	36x7	1
Republic, 20	3½	3095	4½x5½	36x5	36x10	1
Rowe, CW	1½	3000	3¾x5	36x6†	36x6†	W
Rowe, C. D. W.	2	3300	4 x6	34x4	36x3½d	W
Rowe, G. S. W.	3	4150	4 x6	34x5	36x5d	W
Rowe, G. P. W.	3	5250	3¼x5‡	38x7†	42x9†	W
Rowe, HW	4	4500	4¼x6	36x5	36x6d	W
Rowe, F. W.	5	5500	4½x6	36x6	40x6d	W
Sandow, G	1	2295	3¾x5	34x3½	34x5	W
Sandow, CG	1½	2590	3¾x5	34x4	34x6	W
Sandow, J	2½	3275	4½x5¼	36x4	36x7	W
Sandow, M	3½	4295	4½x5½	36x5	36x5d	W
Sandow, L	5	4975	4½x5½	36x6	40x6d	W
Sanford, 25	2½	3350	4½x5¼	36x4	36x4d	W
Sanford, 35	3½	4200	4½x5½	36x5	36x5d	W
Sanford, 50	5	5100	4¾x6	36x5	40x6d	W
Schacht, 2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht, 3-Ton	3	3800	4¼x5½	36x5	36x5d	W
Schacht, 4-Ton	4	4200	4¼x6	36x5	36x5d	W
Schacht, 5-Ton	5	4400	4½x6	36x5	40x5d	W
Schacht, 7-Ton	7	5000	4½x6	36x6	40x7d‖	W
Schwartz, A	1	1625	3½x5	33x4½†	33x4½†	B
Schwartz, BW	1½	2630	3¾x5¼	34x3½*	34x7*	W
Schwartz, C.W.S.	2½	3200	4¼x5½	36x4	36x8	W
Schwartz, DW	5	4900	4½x6	36x6	40x12	W
Selden, 1½A	1½	2360	3¾x5	34x3½	34x5	W
Selden, 2½A	2½	3425	4½x5¼	36x4	36x7	W
Selden, 3½A	3½	4175	4½x5½	36x5	36x10	W
Selden, 5A	5	5600	4¾x6	36x6	40x12	W
Seneca, M	½	1020	3½x4½	30x3½†	30x3½†	B
Service, 15	1¼	1840	3¾x5	31x4½	35x5	B
Service, 220	1½	2115	3½x5½	34x3½	34x5	W
Service, 31	2	2985	4 x5½	36x3½	36x6	W
Service, 36	2	3415	4¼x5½	35x5†	38x7†	W
Service, 51	2½	3175	4¼x5½	36x4	36x7	W
Service, 71	3½	4285	4¼x5½	36x5	36x5d	W
Service, 76	3½	4485	4½x6	36x5	36x5d	W
Service, 101	5	5275	4½x6	36x6	40x6d	W
Signal, NF	1	1950	4¾x5	34x5†	36x6†	W
Signal, H	1½	2450	4½x5¼	34x4	36x6	W
Signal, J	2½	2875	4½x5¼	34x4	36x8	W
Signal, M	3½	3675	4½x5½	36x5	40x5d	W
Signal, R	5	$4400	4¾x6	36x6	40x6d	W
Southern, 10	1	2090	3¾x5	34x3½	34x4	W
Southern, 15	1½	2590	3¾x5½	36x6†	34x4	W
Southern, 20	2	2990	4¼x5¼	36x6†	40x8*	W
Standard, 1-K	1–1½	1600	3¾x5	34x3½*	34x5*	W
Standard, 76	2½–3	2400	4½x5¼	36x4*	36x7*	W
Standard, 66	3½–4	3150	4½x5½	36x5	36x10	W
Standard, 5-K	5–7	4400	4¾x6	36x6	40x12	W
Sterling, 1½	1½	2885	4 x5¾	36x3½	36x5*	W
Sterling, 2	2	3085	4 x5¾	36x4	36x6	W
Sterling, 2½	2½	3290	4½x5¾	36x4*	36x4d*	W
Sterling, 3½	3½	4325	4½x6¼	36x5*	40x5d*	W
Sterling, 5-W	5	4950	5 x6¼	36x6*	40x6d*	W
Sterling, 5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling, 7½	7½	6000	5 x6¼	36x6	40x7d	C
Stewart, 14	¾	1195	3½x5½	32x4½†	32x4½†	I
Stewart, 15	1	1395	3½x5½	35x5†	35x5†	I
Stewart, 9	1½	1790	3¾x5	34x3½	34x5	I
Stewart, 7	2	2090	4¼x5¼	34x4	34x7	I
Stewart, 7-X	2½	2290	4¼x5½	34x4	34x7	I
Stewart, 10	3½	3090	4½x5½	36x5	36x5d	I
Stewart, 10-X	3½	3850	4½x6	36x5	36x5d	I
Stoughton, C	¾	1240	3½x5	34x4½†	34x4½†	W
Stoughton, A	1	1995	3¾x5¼	34x4½†	35x5†	W
Stoughton, B	1½	2350	3¾x5¼	36x3½	36x5	W
Stoughton, D	2	2800	4 x5½	36x4	36x7	W
Stoughton, F	3	3600	4¼x5½	36x5d	36x5d	W
Sullivan, E	2	3350	4¼x5½	36x4*	36x7*	W
Sullivan, H	3½	4650	4½x6	36x5	36x5d	W
Superior, D	1	1650	3¾x5	34x4½†	34x4	I
Superior, E	2	2600	4½x5¼	36x4	36x6	I
Super Truck, 50	2½	3300	4 x6	36x4	36x8	W
Super Truck, 70	3½	4300	4¼x6	36x5	40x5d	W
Super Truck, 100	5	5300	4¾x6	36x5	40x12	W
Super Truck, 150	7½	6300	5 x6	36x6	40x7d	W
Texan, A38	¾	1095	3½x5	33x4	33x4	I
Texan, TK39	1½	1550	3½x5	36x6	38x7	W
Tiffin, GW	1½	2400	4½x5¼	36x3½	36x5	W
Tiffin, MW	2½	3100	4½x5¼	36x4	36x3½d	W
Tiffin, PW	3½	4100	4½x5½	36x5	40x5d	W
Tiffin, F50	5	4800	4¾x6	36x6	40x6d	W
Tiffin, F60	6	5000	4¾x6	36x6	40x12	W
Titan	3½	4100	4¼x5½	36x5	36x10	I
Titan	5	4750	4½x6	36x5	40x6d	I
Titan	2	2850	4x5	34x4*	36x7	I
Titan, 6-Ton	6	5150	4½x6	36x5	40x12	I
Tower, J	1½	2900	4½x5¼	35x5	38x7	W
Tower, H	2½	3200	4½x5¼	36x4	36x7	W
Tower, G	3½	4100	4½x5½	36x5	36x5d	W
Traffic, C	....	1595	3¾x5	34x3½*	34x5*	I
Traffic	3	1895	3¾x5	34x4	36x7	I
Transport, 20	1	1395	3¾x5¼	34x3½	34x4	I
Transport, 30	1½	1905	3¾x5	36x3½	36x5	I
Transport, 50	2½	2785	4¼x5½	36x4	36x7	I
Transport, 70	3½	3885	4½x6	36x5	36x10	I
Traylor, B	1½	2390	3¾x5¼	34x3½	34x5	W
Traylor, C	2	2850	4 x5½	36x4	36x7	W
Traylor, D	3	3300	4¼x5½	36x4	36x8*	W
Traylor, E	4	4450	4½x6	35x5	40x10	W
Traylor, F	5	4700	4½x6	36x6	40x6d	W
Triangle, AA	¾–1	1385	3¼x5	34x4½†	34x4½†	I
Triangle, A	1½	2350	3¾x5¼	34x3½*	34x6*	I
Triangle, C	2	2700	3¾x5¼	36x4*	36x6*	I
Triangle, B	2½	2950	4 x5¾	36x4*	36x7*	I
Triumph, G	1	1995	3½x5½	34x5†	34x5†	W
Triumph, HC	1½	2550	3¾x5¼	36x3½	36x5	W
Triumph, HB	2	2900	3¾x5¼	36x4	36x7	W
Twin City, B.W.	2	2750	4 x5½	36x4	36x7	I
Twin City, A.W.	3½	4000	4¼x6	36x5	40x5d	W
[3]Twin City, B	3½	....	5½x6	36x6	36x6	I
[3]Twin City, A	5	....	5½x6	36x7	36x7	I
Ultimate, A	2	3200	4 x5½	36x3½*	36x6*	W
Ultimate, AJ	2	3250	4¼x5½	35x5†	38x7†	W
Ultimate, AJL	2	3300	4½x5½	36x3½*	36x6	W
Ultimate, B	3	3750	4¼x5½	36x4*	36x4d*	W
Ultimate, BL	3	3850	4¼x5½	36x4*	36x4d*	W
Union, FW	2½	3190	4 x6	36x5*	36x8*	D
Union, HW	4	4485	4½x6	36x6	40x12	D
Union, JW	6	5800	5 x6	36x6	40x14	D
United, A	1½	2445	3¾x5¼	36x3½*	34x5*	I
United, B	2½	3150	4¼x5½	36x4*	36x7*	I
United, C	3½	3975	4¼x5½	36x4*	36x6d	W
United, V	5	5000	4½x6	36x6	40x6d	I
United States, N	1½	1975	3¾x5	36x3½*	36x5*	I
United States, R	3	3075	4 x5¼	36x4	36x4d	W
United States, S	4	3875	4½x5½	36x5	36x5d	W
United States, T	6	4850	4¾x6½	36x6	40x6d	W
Velie, 46	1½	1585	3¾x5	36x3½	36x5	I
Veteran, E**	1–1½	3500	3¾x5¼	35x5†	36x6†	W
Veteran, A**	2–2½	4000	4¼x5½	36x4*	36x7*	W
Veteran, D**	2½–3	4400	4¼x5½	36x4*	36x7*	W
Veteran, H**	3½–4	5600	4¼x6	36x5	36x5d	W
Vim, 29	½	1050	3½x4½	31x4†	31x4†	W
Vim, 30	½	1175	3½x4½	32x4½	32x4½	W
Vim, 31	1	1975	3¾x5½	35x5†	35x5†	W
Vim, 22	2	3150	3¾x5½	36x4	36x6	W
Vim, 23	3	3950	4¼x5½	36x5	36x5d	W
Vulcan, 25	2½	4000	4¼x6	36x4	36x8	W
Vulcan, 25P	3	4500	4¼x6	36x6	40x8	W
Walker-JohnsonA	1½–2	2750	3¾x5	34x5	38x7	W
Walker-Johnson,B	3	3500	4¼x5½	36x4	36x8	W
Walter, S	5	4850	4½x6¼	36x6	40x6d	W
Ward-LaF., 2B	2½	3590	4¾x5¾	36x4	36x7	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. "Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

1—Kelly-Springfield. 2—Nelson Le Moon. 3—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Ward-LaF., 4A	3½	$4690	4½x6½	36x5	36x5d	W
Ward-LaF., 5A	5	5590	5 x6½	36x6	40x6d	W
Watson, E	1	1785	3¾x5½	35x5†	35x5†	W
Watson, N	3½	3825	4½x5½	36x5	36x10	W
Western, W1½	1½	2550	4½x5½	36x3½*	36x5*	W
Western, L1½	1½	2550	3¾x5	36x3½*	36x5*	W
Western, W2½	2½	3250	4½x5¼	36x4	36x7	W
Western, L2½	2½	3250	4¼x6	36x4	36x7	W
Western, W3½	3½	4250	4½x6	36x5	40x5d	W
White, 15	¾	2400	3¾x5½	34x5†	34x5†	B
White, 20	2	3250	3¾x5½	36x4*	36x7	D
White, 40	3½	4200	3¾x5¾	36x5	40x5d	D
White, 45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick., E	1	1225	3¾x5	34x5†	34x5†	W
White Hick., H	1½	1375	3¾x5	36x3½	36x5	W
White Hick., K	2½	1675	4½x5¼	36x4	36x5	W
Wichita, K	1	2300	3¾x5¼	36x3*	36x4*	W
Wichita, L	1½	2690	3¾x5¼	36x3½*	36x5*	W
Wichita, M	2	2800	3¾x5¼	36x3½*	36x6*	W
Wichita, R	2½	3000	3¾x5¼	36x4*	36x7*	W
Wichita, RX	2½	$3600	4¼x6	36x4*	36x8*	W
Wichita, O	3½	4000	4¼x6	36x5*	36x5d*	W
Wichita, S	5	5000	4½x6	36x6	40x6d	W
Wilcox, AA	1	1900	3¾x5½	36x4*	36x4*	W
Wilcox, BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox, D	2½	3000	4¼x5	36x4*	36x3½d*	W
Wilcox, E	3½	3950	4½x6	36x5*	36x5d*	W
Wilcox, F	5	4350	4¾x6½	36x5	40x6d	W
Wilson, F	1½	2270	3¾x5	36x3½	36x5	W
Wilson, EA	2½	2825	4¼x5½	36x4	36x7	W
Wilson, G	3½	3685	4½x5½	36x5	36x5d	W
Wilson, H	5	4520	4¾x6	36x6	40x6d	W
Winther, 751	1	$1795	3½x5	34x4½†	35x5†	I
Winther, 439	1½	2850	3¾x5	32x4	32x4	I
Winther, 39	1½	2450	3¾x5	34x3½	34x5	I
Winther, 49	2	3250	4 x5	34x4	34x4d	I
Winther, 50	2½	3095	4 x6	38x7†	42x9†	I
Winther, 70	3½	4200	4 x6	36x5	36x5d	I
Winther, 450	2½	3690	4 x5	34x5	36x6	I
Winther, 109	5	5250	4½x6	36x6	40x5d	I
Winther, 140	7	5900	5 x6	36x6	40x7d	I
Wisconsin, B	1	1950	4 x5¼	34x5†	34x5†	W
Wisconsin, C	1½	2500	4¾x5¾	36x6†	36x6†	W
Wisconsin, D	2½	3500	4½x6¼	36x6	36x10	W
Wisconsin, E	3½	4000	5 x6¼	36x6†	36x12†	W
Witt-Will, N	1½	2750	3¾x5	36x3½*	36x5*	W
Witt-Will, P	2½	3250	4½x5¼	36x3½*	36x7*	W
Wolverine, J	1	2125	3½x5	34x3	34x4	I
Wolverine, J	1½	2375	3¾x5	34x3½	34x5	I
Wolverine, J	2	2940	3¾x5	34x4	34x7	I
Wolverine, J	2½	3425	4½x5¼	36x5	36x10	I
Wolverine, L	3½	4100	4½x5½	36x5	36x10	I

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††Price includes body. §—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	16-30	$1975	3	Clim.	4-5 x6½	GDK	3-4
Allis-Chalm. B	6-12	925	2	LeR.	4-3½x4½	Gas.	1
Allis-Chal.G.P	6-12	795	2	LeR.	4-3½x4½	Gas.	1-2
Allis-Chalm.	12-20	1350	2	Midw.	4-4½x5½	Gas.	2-3
Allis-Chalm.	18-30	2150	4	Own	4-4¾x6½	GorK	3-4
Allis-Chalm.	10-18	875	4	Own	4-4¾x6½	G,K	4
Allwork...2-G	14-28	1775	4	Own	4-4¾x6	GorK	3
Allwork...C	14-28	1525	4	Own	4-5 x6	GorK	3
AndrewsKin.D	18-36	2500	4	Clim.	4-5 x6½	GorK	4
Appleton	12-20	1500	4	Buda	4-4¼x5½	G,K	2-3
ARO..1921-22	3-5	495	4	Own	1-4½x5	Gas.	1
Aultman-T.	15-30	2200	4	Clim.	4-5 x6½	G,K	4
Aultman-T.	22-45	3420	4	Own	4-5½x8	G,K	6
Aultman-T.	30-60	4500	4	Own	4-7 x9	G,K,D	8
Automot, B-3	12-24	1785	4	Herc.	4-4 x5	Gas.	2-3
Avery,SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-20	....	4	Own	4-4½x6	G,K,D	2-3
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery.....	14-28	....	4	Own	4-4½x7	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates.....	15-25	....	4	Own	4-4¼x6	Ker.	3
Bates Mule..H	15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule,.F	18-25	....	*2	Midw	4-4½x5½	Gas.	3
Bates Mule,,G	25-35	....	*2	Midw	4-4½x6	Gas.	com.
Beeman,....G	2-4	315	4	Own	1-3½x4½	Gas.	....
Best.....	30	3100	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	5450	*2	Own	4-6½x8½	G,K,D	8-9
Boring...1921	....	1850	3	Wauk	4-4¾x5¾	GorK	2
Burn-Oil, 1922	15-30	1495	4	Own	2-6¾x7	Ker.	3-4
Capital.....	15-30	1000	2	Own	4-4¼x6	Gas.	3
Case.....	10-18	800	4	Own	4-3½x5	GorK	2
Case.....	15-27	1680	4	Own	4-4½x6	GorK	3
Case.....	22-48	3100	4	Own	4-5½x6¾	GorK	4-5
Caterpillar T11	25	3975	*2	Own	4-4¾x6	Gas.	4
Caterpillar T16	40	6050	*2	Own	4-6½x7	Gas.	6
Centaur.....	5-2½	385	2	N Way	2-4½x4½	GorK	1
Chase.....	12-25	1725	3	Buda	4-4¼x5½	GorK	2-3
Chicago....40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac.....F	9-16	845	*2	Own	4-3½x4½	G,K,D	2
Cletrac.....W	12-20	1495	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1500	3	Dom,	4-4¾x6	Gas.	3
Dart.....B.J.	15-30	1800	4	Buda	4-4½x6	Gas..	3-4
Depue.....A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill.....D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill.....R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-It-All....A	3-6	595	..	Own	1-4½x5	Gas.	1
Eagle.....F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle.....F	16-30	....	4	Own	2-8 x8	GorK	4-5
E-B. AA	12-20	1445	4	Own	4-4¾x5	G,K,D	3
E-B.....Q	12-20	925	4	Own	4-4¾x5	G,K,D	3
E-B.....	16-32	2080	4	Own	4-5¼x7	G,K,D	4
Evans.....	18-30	2000	4	Buda	4-4½x6	G,K	3
Fageol.....D	9-12	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse.B	18-30	1885	4	Clim.	4-5 x6½	G,K	3-4
Farquhar.....	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar.....	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar.....	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch.....4	20-35	....	4	Clim.	4-5 x6½	GorK	3-4
Flour City....	20-35	....	4	Own	4-5¼x6	Ker.	4-6
Flour City....	30-50	....	4	Own	4-6¾x7	Ker.	6-8
Flour City....	40-70	....	4	Own	4-7½x9	Ker.	8-10
Ferdson.....	.....	625	4	Own	4-4x5	G,K	2
Fox.....E	20-40	3100	4	Own	4-5½x7½	G or K	4
Franklin....G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-4
Franklin....C	18-30	3350	*2	Clim.	4-5 x6½	G or K	3-4
Franklin...G2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt...A	18-36	$2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray.....1920	18-36	2000	3	Wauk	4-4¾x6¾	Gas.	4
Ground Hog..	19-31	2000	4	Erd.	4-4 x6	G or K	3
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr..20	20	945	4	Own	2-5¼x6½	K,D.	2
Hart-Parr..30	30	1295	4	Own	2-6½x7	K,D.	3
Heider.....D	9-16	1170	4	Wauk	4-4¼x5¾	G,K	2
Heider.....C	12-20	1395	4	Wauk	4-4½x6¾	G,K	3
Heider...Cult	6-10	1050	4	LeR.	4-3½x4½	Gas.	1
Hicks.....	20-30	....	4	....	4-4½x6	K or G	4
Huber Light 4	12-25	1185	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3
Illinois, Super-Drive.....C	18-30	....	4	Clim.	4-5 x6½	G,K	4
Imperial...E	40-70	4500	4	Own	4-7½x9	G,K,D	10
Indiana.....F	5-10	895	2	LeR.	4-3½x4½	Gas.	1-2
International.	8-16	900	4	Own	4-4½x5	G,K,D	2
International.	15-30	1750	4	Own	-5¼x8	G,K,D	4
J-T.....N	20-40	....	*2	Chief.	4-4¾x6	G,K,D	3-4
Klumb.....F	16-32	1475	4	Clim.	4-5 x6½	....	..
Knudsen..1920	25-45	2500	4	Own	4-5 x9	Gas	4-6
LaCrosse...M	6-12	650	4	Own	2-4 x6	G,K	1
LaCrosse...G	12-24	985	4	Own	2-6 x7	G or K	3
Lauson.....5	12-25	1495	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....20	15-25	1685	4	Beav.	4-4½x6	G or K	3-4
Lauson.....21	15-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Lauson Read.	15-30	2225	4	Beav.	4-4¾x6	K	..
Leader.....B	12-18	1095	4	Own	2-6 x6½	G,K,D	2-3
Leader.....N	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4
Leader.....GU	18-35	2775	*2	Clim.	4-5 x6½	G,K	3-4
Leonard....E	20-30	2530	4	Buda	4-4½x6	G,K	3
Linn.....H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn.....W	60	5100	*	Wauk	4-5 x6¼	Gas	6
Little Giant,.B	16-22	2200	4	Own	4-4½x5	K	4
Little Giant,.A	26-35	3300	4	Own	4-5½x6	K	6
Lombard..1921	85-150	....	*2	....	6-5½x6¾	Gas.	16
Lombard..1921	50	....	*2	....	4-4¾x6½	....	6-10
Magnet.....B	14-28	1875	4	Wauk	4-4½x6¼	K&G	3
Master Jr.....	5-10	585	..	LeR.	-2¾x4	Gas.	1
MerryGar1921	2	230	2	Evin	1-2½x2½	Gas.	..
Minne...All-P	12-25	900	4	Own	4-4½x7	G or K	3
Minne. Gen.P	17-30	1675	4	Own	4-4¾x7	G or K	3-4
Minne. Med.Duty	22-44	3000	4	Own	4-6 x7	G or K	5-6
Minne. HeavyDuty	35-70	4150	4	Own	4-7½x9	G or K	8-9
Mohawk..1921	8-16	785	2	Light	4-3¼x4½	K or G	1-2
Moline Univ D	9-18	990	2	Own	4-3½x5	Gas.	2-3
Moline Orch.	9-18	1075	2	Own	4-3½x5	Gas.	2-3
Motor Macult.	1½	195	2	Own	1-2¾x3½	Gas.	..
Motex.....	15-30	2250	4	Buda	4-4½x6	Gas.	3-4
NB.....1	3-6	425	4	Own	2-3¾x4	Gas.	1
Nichols-Shep. .....2)-42.	20-42	3100	4	Own	8 x10	G or K	3-6
Nichols Shep. 25-50	25-50	3460	4	Own	9 x12	G or K	4-7
Nilson Senior..	20-40	2475	5	Wauk	4-5 x6¼	G,K	4
Oil Pull.....K	12-20	1485	4	Own	2-6 x8	K,D	3
Oil Pull.....H	16-30	2285	4	Own	2-7 x8½	K,D	4
Oil Pull.....G	20-40	3175	4	Own	2-8 x10	K,D	5-6
Oil Pull.....E	30-60	4590	4	Own	2-10x12	K,D	8-10
Oldamar GarK	2½-5	395	4	Own	1-5½x5½	Gas.	1
Oliver.....A	15-30	....	*2	Beav.	4-4½x6	G or K	3-4
Once Over Tiller Mark..6	12-25	3000	4	Strns	4-4½x6	Gas.	2
Parrett.....K	15-30	1950	4	Pitt	4-4½x6	G,K	3
Peoria.....L	12-25	1600	4	Clim.	4-5 x6½	G,K	3
Pioneer.....G	13-36	....	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	30-60	....	4	Own	4-7 x8	Gas.	10
Plowman....A	15-30	1605	4	Buda	4-4½x6	G,K	3-4
Port Huron .A	12-25	$1500	4	Chief	4-3¾x6	G,K	3
Ranger Cul. T-20	8-16	....	4	LeR.	4-3½x4½	Gas.	1
Reed.....A	15-30	1985	4	Wauk	4-4½x6¼	G or K	3-4
Reed.....A-1	18-36	2185	4	Wauk	4-5 x6¼	Gas.	4
Reliable.....	10-20	885	4	Own	2-6 x7	Ker.	2
Rex.....	12-25	1600	4	Wauk	4-4¼x5¾	G or K	3
Russell.....	12-24	1500	4	Own	4-4¼x5¾	G or K	2-3
Russell.....	15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell.....	29-35	3000	4	Own	4-5½x7	G or K	4-5
Russell.....	30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson....M	..	....	4	Nor	4-4 x5½	G,K	2
Sandusky,...J	10-20	1250	4	Own	4-4¼x5¼	G,K,D	2
Sandusky...E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
Shawnee Com.	6-12	....	2	LeR.	4-3½x4½	Gas.	1
Shawnee Com.	9-18	....	2	Gray	4-3½x5	....	..
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby.....C	10-20	....	4	Erd.	4-4 x6	G or K	2-3
Short Turn...	20-40	1500	3	Beav.	4-4¾x6	G,K	3
Steady Pull..	12-24	1485	4	Own	4-4 x5	Gas.	3
Stinson....4E	18-36	1835	4	Beav.	4-4¾x6	G,K	4
Stone.....	20-40	2250	4	Beav.	4-4¾x6	G,K	4
Tioga.....3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Titan.....	10-20	900	4	Own	2-6½x8	G,K,D	3
Topp.....B	30-45	3500	4	Wauk	4-4¾x6¾	Gas.	3-4
Toro Cultivator	6-10	....	3	LeR	4-3½x4½	Gas.	2
Townsend....	10-20	895	2	Own	4-6½x7	Ker.	2-3
Townsend....	15-30	1485	2	Own	4-7 x8	Ker.	3-4
Townsend....	25-50	2750	2	Own	4-8½x10	Ker.	4-8
Traction Motor	40-50	....	4	....	8-3¼x5	Gas.	4-5
Traylor....TB	6-12	715	4	LeR.	4-3½x4½	Gas.	1-2
Triumph....H	18-36	2450	2	Erd.	4-4¾x6	Ker.	4
Trundaar...10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Turner...1921	14-25	1295	4	Buda	4-4¼x5½	G,K	3
Twin City....	12-20	1580	4	Own	4-4¼x6	G,K	3
Twin City....	20-35	3175	4	Own	4-5½x6¾	G,K	5
Twin City....	40-65	5250	4	Own	4-7¾x9	G,K	8
Uncle Sam C20	12-20	1385	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	2300	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Universal.....	1-4	475	2	Own	1-3½x5	G	1
Utilitor....501	2½-4	380	4	Own	1-3½x4½	G	1
Victory...1921	9-18	1350	4	Gray	4-3½x5	Gas.	2
Victory...1921	15-30	1750	4	Wauk	4-4½x5¾	Gas.	3
Vim.....B	15-30	1650	4	Wauk	4-4¾x5¾	G,K	3
Wallis.....K	15-25	1600	4	Own	4-4¼x5¾	G,K	3
Waterloo...N	12-25	1450	4	Own	2-6½x7	G,K	3
Webfoot....53	28-53	5000	*2	Wisc.	4-5¾x7	G,D	6
Wellington..B	12-22	....	4	Erd	4-4 x6	Ker.	2-3
Wellington..F	16-30	....	4	Chief	4-4¾x6	Ker.	3-4
Western..1920	16-32	2100	4	Clim.	4-5 x6½	Gas.	4
Wetmore21-22	12-25	1585	4	Wauk	4-4 x5¾	G,K	3
Wharton. W-E	12-20	1800	3	Buda	4-4½x5½	Gas.	2
Whitney....B	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	2250	4	Clim.	4-5 x6½	G or K	3
Wisconsin...F	20-40	2450	4	Wauk	4-5 x6¼	G or K	4
Wisconsin,..H	22-40	3200	4	Clim.	4-5½x7	G or K	4-6
Yuba....12-20	12-20	2600	*2	Wisc.	4-4½x6¾	G,K,D	3
Yuba....15-25	15-25	3100	*2	Wisc.	4-4¾x6	G,K,D	..
Yuba....20-35	20-35	4185	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba....25-40	25-40	4650	*2	Wisc.	4-5¾x7	G,K,D	..
Zelle.....	12-25	....	4	....	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Strns.—Stearns. T.C.—Twin City. Wauk.—Waukesha. Weid.—Weidely. Wis—Wisconsin. *—Crawler type. All others are wheel type.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

New York	National Automobile Show	Jan. 7-13
New York	National Body Builders' Show	Jan. 9-14
Buffalo	Buffalo Automobile Dealers' Assn.	Jan. 14-21
Philadelphia	Automobile Show	Jan. 14-22
Rochester	Automobile Show	Jan. 16-21
Tulsa, Okla.	Automobile Show	Jan. 16-21
Oakland, Calif.	Automobile Show	Jan. 16-22
Milwaukee	14th Annual Automobile Show	Jan. 19-25
San Francisco	Automotive Equipment Exposition	Jan. 21-27
Detroit	Automobile Show	Jan. 21-28
Cleveland	Cleveland Mfrs.-Dealers' Assn.	Jan. 21-28
Baltimore	Annual Automobile Show	Jan. 21-28
Portland, Ore.	Annual Automobile Show	Jan. 23-29
Montgomery, Ala.	Alabama Automobile Dealers' Assn.	Jan. 23
Binghamton, N. Y.	Binghamton Dealers' Assn.	Jan. 23-28
Toledo	Automobile Show	Jan. 23-28
Allentown, Pa.	Lehigh Automobile Trade Assn.	Jan. 28-Feb. 4
York, Pa.	York County Dealers' Assn.	Jan. 28-Feb. 4
Chicago	National Automobile Show	Jan. 28-Feb. 4
Chicago	Automobile Salon	Jan. 28-Feb. 4
Erie, Pa.	Automobile Show	Jan. 30-Feb. 4
Scranton, Pa.	Annual Automobile Show	Jan. 30-Feb. 4
Lancaster, Pa.	Automobile Trade Assn.	Feb. 1- 4
Pontiac	Pontiac Automobile Dealers' Assn.	Feb. 1-4
Columbus	Columbus Automobile Dealers' Assn.	Feb. 2- 8
Tampa, Fla.	South Florida Fair Assn.	Feb. 2-14
Troy, N. Y.	Eighth Annual Used Car Show	Feb. 4-11
Youngstown	Youngstown Dealers' Assn.	Feb. 4-11
Scranton, Pa.	Annual Motor Truck Show	Feb. 6- 9
London, Ont.	Nat'l Motor Show of West Canada	Feb. 6-11
Minneapolis	Tractor Show	Feb. 6-11
Minneapolis	Automobile Show	Feb. 4-11
Winnipeg, Can.	Canadian Equipment Assn.	Feb. 6-11
Schenectady	Schenectady Dealers' Assn.	Feb. 6-11
Flint, Mich.	Mich. Automotive Trade Assn.	Feb. 8-11
Kansas City	Kansas City Motor Dealers' Assn.	Feb. 11-18
Atlanta	Southern Automobile Show	Feb. 11-18
San Francisco	6th Annual Pacific Automobile Show	Feb. 11-18
Kalamazoo, Mich.	Mich. Automotive Trade Assn.	Feb. 14-18
Albany	Automobile Dealers' Assn.	Feb. 18-25
Hartford, Conn.	Hartford Automobile Dealers' Assn.	Feb. 18-25
Duluth, Minn.	Automobile Show	Feb. 20
Bethlehem, Pa.	Automobile and Accessory Show	Feb. 20-25
Louisville, Ky.	14th Annual Automobile Show	Feb. 20-25
Syracuse	14th Annual Automobile Show	Feb. 20-25
Gr. Rapids, Mich.	Michigan Automotive Trade Assn.	Feb. 20-25
Deadwood, S. D.	Deadwood Business Club	Feb. 21-25
Springfield, Ill.	Automobile Show	Feb. 23-25
Montreal	Automobile Show	Feb. 25-Mar. 1
Des Moines	Winter Automobile Show	Feb. 26-Mar. 3
Bethlehem, Pa.	Truck and Tractor Show	Feb. 27-28
Elmira, N. Y.	Elmira Automobile Club	Feb. 27-Mar. 4
Muskegon, Mich.	Michigan Automotive Trade Assn.	Feb. 27-Mar. 4
Portland, Ore.	Portland Dealers' Assn.	Feb. 27-Mar. 4
Springfield, Mass.	7th Annual Automobile Show	Feb. 27-Mar. 4
Windsor, Ont.	Automobile Show	Feb. 27-March 4
Bay City, Mich.	Michigan Automotive Trade Assn.	Feb. 28-Mar. 4
Wichita, Kan.	Wichita Motor Trade Assn.	Feb. 28-Mar. 4
Ardmore, Okla.	Ardmore Automobile Dealers' Assn.	March
Galesburg, Ill.	Galesburg Automotive Dealers' Assn.	March
Madison, Wis.	Four Lakes Bldg.	March
San Antonio	Automobile Trades Assn.	March
St. Louis	Manufacturers' and Dealers' Assn.	March
Brooklyn	Eleventh Annual Show	Mar. 4-11
Saginaw, Mich.	Michigan Automotive Trade Assn.	Mar. 6-10
Indianapolis	Annual Automobile Show	Mar. 6-11
Nashville	Nashville Automobile Trades Assn.	Mar. 6-11
Wilmington, Del.	Wilmington Trade Assn.	Mar. 6-13
Denver	Denver Automobile Trade Assn.	Mar. 10-20
Boston	Annual Automobile Show	Mar. 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	Mar. 11-18
Boston	Automobile Salon	Mar. 13-18
Omaha	Omaha Automobile Trade Assn.	Mar. 13-18
Port Huron, Mich.	Michigan Automotive Trade Assn.	Mar. 15-18
Ypsilanti, Mich.	Michigan Automotive Trade Assn.	Mar. 21-22
Ann Arbor, Mich.	Michigan Automotive Trade Assn.	Mar. 24-25
Ben. Harb., Mich.	Michigan Automotive Trade Assn.	Mar. 28-31
Bat. Creek, Mich.	Michigan Automotive Trade Assn.	April 2- 8

FOREIGN SHOWS

London, England	Automobile Show	Feb. 6-11
Santiago, Cuba	Annual Automobile Show	March, 1922
Rio de Janeiro	Automotive Exhibition	Sept., 1922

CONVENTIONS

Chicago	Am. Road Builders' Conv. and Show	Jan. 17-20
Chicago	Fifth Annual N. A. D. A. Convention	Jan. 30-31

COBB NAMES HIS SUBJECT

New York, Jan. 10—Irvin S. Cobb, who will be one of the speakers at the annual dinner of the National Automobile Chamber of Commerce on the evening of Jan. 10, has informed Alfred Reeves that his subject will be, "Gasoline the New National Drink." The other speaker at the dinner will be Secretary of the Navy Denby, who has not yet announced his subject.

'MEMBER THE BIBLE LAMPS?

Sacramento, Calif., Jan. 11—Twelve thousand arrests have been made in California in the last three months for violation of the headlight laws, according to Chief Inspector Steve Neal of the Motor Vehicle Department. The campaign began in Sacramento at the state fair, and has been extended in all directions, covering all parts of the state.

NATIONAL USED CAR SCHEME

Buffalo, Jan. 11—Resolutions to abolish present methods of dealing with used automobiles and favoring the establishment of a national company for their disposal were adopted at a meeting of the Automobile Dealers' Assn. of Buffalo. The resolutions were drawn after extensive study by a committee. Jamestown dealers attended the meeting and heard the new plan outlined by H. H. Brooks, general sales manager for the Marmon Automobile Co.

SPRINGFIELD SHOW FEB. 23-25

Springfield, Ill., Jan. 11—Automobile Dealers' Assn. will hold its third annual auto show in the state arsenal here Feb. 23-24-25. The committee in charge of the show is Chas. H. Edmands, A. J. Dohle and Robert E. Hatcher, Jr. Basil W. Ogg is show manager.

TULSA SHOW JAN. 16

Tulsa, Okla., Jan. 10—The sixth annual automobile show will be staged here Jan. 16, and will continue for six days and nights. The show will be held in the Billy Sunday Tabernacle, allowing the dealers more than 50,000 sq. ft. of floor space for exhibits.

GMC CANADIAN RESUMES

Detroit, Jan. 10—The Canadian products division of General Motors of Canada, Ltd., has resumed operations in its plants at Walkerville on an increased scale after being closed one week for inventory. It has been operated continuously for the past year, employing from 600 to 1000 men, manufacturing motors and axles for Buick, Oldsmobile and Chevrolet cars. The expansion of operations is due to the new policy of General Motors to manufacture in Canada all cars of these lines which are sold in the export trade.

GAS TAX FOR MARYLAND

Baltimore, Jan. 9—In his message to the General Assembly of Maryland, Governor Ritchie has asked the members to pass a bill which would place a tax of one cent per gallon on gasoline, beginning Jan. 22, 1922. The tax has already been approved by the Automobile Club of Maryland and the Automobile Trade Assn. of Baltimore.

Captain Eddie Rickenbacker recently gave a luncheon for Messrs. Allison and Rood and their sales organization, which will represent the Rickenbacker car in Chicago. Captain Rickenbacker gave a short talk in which he outlined the history of his new car and the company he organized to build it.